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INSTITUTES
OF
SURGERY:

ARRANGED IN THE ORDER OF THE LECTURES DELIVERED IN
THE UNIVERSITY OF EDINBURGH.

BY

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PHILADELPHIA:

PUBLISHED BY A. WALDIE, 46 CARPENTER STREET.

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PREFACE AND DEDICATION.

The study of Surgery, an art unexampled in the weight of responsibility which it imposes, must be prosecuted in more than one way,—at lectures, by attendance on the hospital, and by reading. There must be a book of ready reference. That book, to be useful, must recall to the reader's recollection the demonstrations and the reasonings which he has heard at lecture; for no book can be written which is sufficient for the practice of the profession. And it should state correctly, however shortly, the rules which are to guide the judgment and the hand of the practitioner, in the moment in which he is called upon to the performance of his high duties.

The book should also contain references to some of the best authors, with a recommendation of those which ought to be read. But it is, above all, important that such a work should contain so much of criticism at least, as may guard the reader against the bad influence of writers who have not known the hazards and difficulties of practice; who make unhesitating and bold assertions, where good and experienced men hesitate and are afraid; who write rather to obtain a name, (an object not altogether to be condemned,) than to guard their successors against the errors which they have witnessed, or to detail the means by which they themselves have happily succeeded.

I may allow myself to hope that the teachers under whom I have studied, the large and intimate intercourse which I have enjoyed with the best surgeons of my time, and the practice of a great hospital for upwards of twenty years, will save me from the imputation of presumption in attempting that which, in one sense, must ever be an unprofitable labour. But my situation imposes it upon me as a duty; while my long superintendence of the juniors as house-surgeons and dressers, and the examinations of those about to commence the serious duties of their profession, have proved to me the necessity of such a work.

Knowing the opinions that prevail, I have sometimes entered into discussion in order to enforce the true principle. But the greater part of the contents of this volume, I wish rather to be considered

as the conclusions drawn from the prelections, than as intended to present the whole argument, or to cite all the authorities on which the practice rests.

With sincere good wishes for my young friends, and fully aware of the difficulties and anxieties which they are about to encounter, I dedicate these volumes, and the remainder of my active life, to the Students of the University of Edinburgh.

AINSLIE PLACE,
20th October, 1837.

INTRODUCTORY CHAPTER.

COURSE OF STUDY.

Those who have most improved the art of Surgery have passed at once from the school to the dissecting room. The notion which prevailed with medical men in London was, that we should acquire distinct notions of things from the dead subject, and not from books. Often we have heard it said, "Mr. Hunter never read, why should I?" Thus were persons of very moderate abilities regulating themselves by a man of uncommon genius. When an opinion prevails extensively (as this did for thirty years after Mr. Hunter's death), there is always a foundation for it; and the truth is, that the labours of the dissecting room are the most essential to the surgeon. But something more is required for the accomplished surgeon. He is no longer a mere artist, a worker with his hands alone. The common sense of mankind has thrown into his department the treatment of many diseases, which require all the advantages of education hitherto imparted to the physician. The studies of the physician and of the surgeon have become the same. Ancient languages are at least necessary to a correct nomenclature; and modern languages, to open new sources of information. The surgeon's medical studies must be liberally pursued: and a knowledge of natural philosophy must precede and accompany his professional acquirements.

Commencing under an anatomical teacher (who should know the true uses of anatomy), and having a general idea of the system of animal bodies, the student of surgery should undertake dissection early. This he must do to acquire an intimate knowledge of structure and a dexterous hand; and this is so necessary, that he should be in the anatomical rooms during the greater part of his attendance on the winter classes.

It is essential that he should practice some mechanical exercise, that he may acquire an accordance between the eye and the hand. My brother John Bell put me to drawing, modelling, and etching, with this view; but perhaps the best exercise of all is the art of anatomical preparation,—a very different matter from that exercise of the scalpel with which students are generally satisfied. Besides,

it is this art of anatomy which conveys the knowledge not only of structure but of pathology; for the hasty examinations of the physicians in the dead-house are comparatively of little value.

The objects which should occupy the young surgeon in the dissecting-room are these: Every thing done should have reference to the living body—the forces which act on the bones and ligaments—the classification of the muscles, and their action in cases of fracture and dislocation. Next to the ligaments in importance are the fasciæ. Then the dissector, to be usefully employed, must observe the exact relation of parts—the course of arteries—their bearings with regard to the points of bone and to the course of muscles and of their tendons—their sheaths, and the fasciæ which cover them: In short, the parts to be recognised in cutting for them in the living body. He should make particular dissections, repeatedly and with great care. For example, the parts concerned in hernia—the anatomy of the perineum and the parts cut in lithotomy—the anatomy of the neck—and of the axilla, deserve particular dissection; and in this he does not dissect arteries and nerves as the distinct object of his studies, but he should look upon the system combinedly, and on each part in relation to the others.

Repeated courses of dissection pursued with these objects make a dexterous surgeon. But unfortunately they do more; they produce an itching desire to be operating and performing great operations,—a disposition which should be jealously watched, and which it requires years of self-examination and of experience to moderate.

This moderation ought to be acquired in the hospital. The student sees there great operations dexterously performed amidst the applause of hundreds: But it would be well for him to study the consequences of these exhibitions;—to follow the patient into the ward, there to learn the difference between dissecting and operating;—to see how much the human constitution can bear, and be directed to the study of the powers of life and of the constitution.¹

When you come to be an operator, you would do well to catechise yourself:—Does the operation bid fair to give relief? Is it to be of advantage, as promoting the improvement of the profession? Has *self* any thing to do in the matter—vanity of display, or personal distinction and consequent emolument?

Clinical instruction is the last and best stage of this laborious course of study: and to maintain his spirits and perseverance during it, the student must look to the noble consequences, the power which

¹Men's opinions being unsettled, go into extremes; they vibrate like the pendulum. The author has lived long enough to have witnessed changes in the character of the profession, and in his native city. The time was when the surgeon studied with no other view than the physician; and the operations of surgery were performed according to a rule which directed the instrument as in a handicraft business. Mr. John Bell powerfully ridiculed this state of the profession, and spoke eloquently of the advantages of anatomy. Matters are now reversed, if not improved, and Edinburgh surgeons are noted for desperate operations and great dexterity. It must be our study to strike the mean between two extremes.

knowledge places in his hands. Happily clinical instruction, as it was commenced in our University, so has it continued to be taught with great ability and diligence.

The student of surgery should take his cases with the utmost care; for those early impressions furnish him with points round which all his future acquisitions are necessarily arranged. To these he will return often. These in after life are the true testimonials of diligence and merit.

There is nothing more important to the formation of a surgeon than a well selected library; books to which he may refer to keep up in him a spirit of inquiry and improvement. In noticing here a few authorities, I have preferred English authors, principally because they stand distinguished by truth of narration. From these you may select and form a portable library, which having studied diligently, you become capable of judging what additions your circumstances permit you to make.

Peruse in the library the published lectures of Sir Astley Cooper, and those of Mr. Lawrence and Sir Benjamin Brodie. There is a spirit in the first which all who love their profession desire to see universal; reading and judgment appear in every sentence of the second, and experience and conduct in the last.

John Pearson's *Principles of Surgery* is a very good introduction—a safe book for a student. He was a learned and a successful practitioner. To beget in the student a respect and a love for his profession, let him read Mr. John Bell's works, especially his octavo volume on wounds. His larger work will relieve the tedium of professional reading.

Sixty-five years ago, the studies of the surgeon were principally of the French authors, Dionis, Le Dran, Morand, Petit, Sabatier.¹ Translations, such as that of Heister or Le Dran, were in their hands. Sagacious men had improved their practice beyond the precepts of these authors; but the duty to the profession at large was not thought of: we had few writers.

When men found it to be a duty to promulgate their opinions and practice, the genius of the country for sound philosophy and practical good sense soon manifested itself. Sharp, a surgeon of Guy's Hospital, was the commentator on the French writers. His book is entitled, *A Critical Inquiry into the state of Surgery*. With it you commence the study of English works, not taking it as an authority, but historically. You set out from it to mark the rapid improvement of surgical knowledge in this country, by Warner, Pott, and Cheselden. This brings you to John Hunter, a man of a different stamp from all who had gone before. In his hands anatomy became truly the foundation of our profession, allying it with science.

Instead of some coarse dissections made in an hospital, John Hunter, under the liberal tuition of his brother Dr. William Hun-

¹ In the *Memoirs of the Academy of Surgery of Paris*, noble work, worthy of that country.

ter, studied minute structure ; not in man alone, but in all classes of animals ; and not for the vain objects of natural history, but to obtain a knowledge of life,—of the functions of the living animal body,—and all ultimately as a foundation of pathology for the relief of mankind. If you desire the history of Mr. Hunter's labours, or look for his eulogy, go into the museum of the College of Surgeons of London, and there, as in St. Paul's is said of Sir Christopher Wren—"Si monumentum requiris, circumspice."—There you will perceive by what extraordinary exertions of genius, ever active and enterprising, that one man has laid a new foundation for the profession, and taught by what means it is to be further pursued.

To Mr. Hunter succeeded Mr. Cline, Mr. Abernethy, Sir Astley Cooper, Mr. John Pearson, his pupils : all of whom, with the exception of Cline, have left works worthy of perusal.

To Cline, however, surgery is greatly indebted. During my thirty years' sojourn in London, his authority was paramount. His industry, moderation, and excellent sense, joined to great experience, made him the chief authority in practice for many a day. And although he has unfortunately left nothing by which posterity can judge of him, his opinion settled many questions of practice.

You will find quoted in the succeeding pages my colleagues Sir George Ballingall on Military Surgery ; Professor Syme on Excision of the Joints ; and Dr. Thomson on Inflammation ; Sir Astley Cooper on Hernia, and on the diseases of the Breast and of the Testes ; Mr. Hodgson on Aneurism ; Mr. Lawrence on Ruptures ; Sir B. Brodie on the Joints ; Mr. Travers on Injuries of the Intestines ; Ford on the Hip Joint ; Home on the Prostate Gland.¹

The best essays in English surgery are contained in the transactions of societies. Of these the Medical Essays of Edinburgh, the Medical Observations and Inquiries, and the Transactions of the Medico-Chirurgical Society, are the most distinguished for the narrative of important cases, and for a spirit of inquiry and improvement.

But I am exceeding all bounds. These, however, or a portion of them, will enrich my reader's mind and mature his judgment. After such a course of study he will stand in no need of a monitor.

¹ A good-natured friend has added, "The Nervous System by Sir Charles Bell ;" and if I must speak freely, I think it necessary to the study of symptoms in all the departments of practice.

CONTENTS.

DIVISION I.

THE GENERAL PRINCIPLES, AND EXTERNAL INJURIES.

	Page
CHAPTER I. Of Health and the Constitution.	1
CHAPTER II. Inflammation as consequent on Wounds and Operations.	5
CHAPTER III. Adhesion.	9
CHAPTER IV. Suppuration and Abscess.	12
CHAPTER V. Erysipelas.	20
CHAPTER VI. Mortification.	23
CHAPTER VII. Of Wounds.	26
CHAPTER VIII. Of Hemorrhage.	30
CHAPTER IX. Of Gunshot Wounds.	43
CHAPTER X. Of Textures.	51
CHAPTER XI. Of Ulcers.	52
CHAPTER XII. Diseases of Bone, introductory to Fracture.	58
CHAPTER XIII. Fractures.	62
CHAPTER XIV. Fracture of the Thigh-bone.	68
CHAPTER XV. The Conditions of the Spine, its Accidents and Diseases.	81
CHAPTER XVI. Injuries of the Head.	97
CHAPTER XVII. Dislocations.	100
CHAPTER XVIII. Injuries to the Joints.	112
CHAPTER XIX. Of Blight and Malformation of the Extremities.	125

DIVISION II.

OF THE DISEASES OF THE NATURAL PASSAGES, AND THE OPERATIONS PERFORMED FOR THEIR RELIEF.	127
---	-----

CHAPTER XX. The Diseases of the Urethra and Bladder, and the Operations Performed for their relief.	162
---	-----

DIVISION III.

OF THE GREAT OPERATIONS.	194
----------------------------------	-----

CHAPTER XXI. Of Amputation.	ib.
CHAPTER XXII. The Diseases of the the Testicle, and the Operations Performed for their Relief.	211
CHAPTER XXIII. Of Hernia.	223
CHAPTER XXIV. Of the Stone—Sounding—Lithotomy—Lithotriety.	241
CHAPTER XXV. Aneurism.	255
CHAPTER XXVI. Accidents from Bleeding in the Arm.	266
CHAPTER XXVII. Of Aneurism by Anastomosis.	270
CHAPTER XXVIII. Diseases and Injuries of the Nerves, and the operations proposed for their Relief.	272
CHAPTER XXIX. Of Wounds of the Great Cavities, the Abdomen and Thorax.	283
CHAPTER XXX. Of Wounds in the Neck and Throat.	297
CHAPTER XXXI. Of the Diseases of the Eye, and the operations performed on the Eye.	300
CHAPTER XXXII. Diseases of the Joints.	314

CONTENTS.

CHAPTER XXXIII. On Tumours, Cancer, and Diseases of the Mamma.	Page 322
CHAPTER XXXIV. Of the Diseases in the parts of the Female Pelvis which require the aid of the Surgeon.	335
CHAPTER XXXV. Of Syphilis.	342
Additional Note on burns, &c.	355
APPENDIX. Containing Cases and Observations, Illustrative of the Text.	357

INSTITUTES OF SURGERY.

DIVISION I.

THE GENERAL PRINCIPLES AND EXTERNAL INJURIES.

CHAPTER I.

OF HEALTH AND THE CONSTITUTION.¹

Under this title a bulky volume may be written. There are some deductions from the introductory lectures which may be noted, and ought to be ever kept before the surgeon; questions which he must put to himself, when a patient is laid down to be confined in consequence of some severe accident; or when he is about to perform an operation attended with division of integument.

There is an influence bearing on the constitution, before there are visible signs of disease.

Most men are in a condition removed from that of perfect health.

[Hence the mistakes in believing it possible to do operations on the human body, which succeed as experiments on brutes.

The mind, too, has influence. A man having been bitten by a mad dog, ran into the hospital. I cut out the piece; in two days his arm mortified to the shoulder.]

It is necessary to study the slightest sign of this condition. Thus it is, that a man walks about and visits his friends, having no disease visible to the unexperienced eye; but when an operation is performed, then the prevailing disposition of the system shows itself.

¹ Read Mr. Abernethy *On the constitutional origin of local diseases*, and Travers *On constitutional irritation*. Some valuable observations in Mr. Hunter *On the blood*; Sir George Ballingall's introductory chapters.

[Therefore we ask—Is there flatulence and loss of appetite? Fætor of the breath? Unnatural colour and smell of stools? The tongue—is it whitish, dry, furred? Is there tenderness of the epigastrium? Is the urine turbid—the eye suffused—and the complexion dull?]

If an operation be performed with a state of system removed from that of health; then there is irritability of stomach. The lips of the wound do not swell and inflame as they ought to do, were they divided in a healthy body. The lips remain flaccid and apart; a gleet discharge is poured out; the fascia is bare and sloughy; the patient refuses food; the countenance is that of misery, and he sinks.

[When in such a condition a tumour has been extirpated; the consequence of a trifling wound has been erysipelas, mortification, and death!]

Too much attention cannot be paid to the state of the stomach; yet, theoretically, there is an error which leads to the neglect of important circumstances.

[Mr. Abernethy's views were too much confined by his practice in the east of London, and the hospital. Those peculiarities of constitution which defeat the best planned operations of the surgeon, do not altogether and at all times owe their origin to the stomach. If a man must limit himself to one remedy, *his* was the best. There is an influence before the stomach becomes deranged; and, acting on the great aphorism, *to remove the cause*, we must think of these influences. Let the reader peruse the history of campaigns in foreign climates, and he will be made aware of them.]

Thus, confinement, bad ventilation, depression of mind, precede and occasion the recognisable symptoms of disordered functions.

[There are many things which escape our observation in the individual which are obvious in the mass. *e. g.* Aboard a ship, after a severely contested battle, the men who have suffered amputation will exhibit different conditions in the healing process of the stump, according as they are laid low and remote from the port-hole, or near it, and raised from the deck. This adheres; that suppurates; a third is fetid and sloughy, preceded by fever,—according to the freedom of ventilation. (Conversation with Dr. Dickson.)

The surgeon should make himself acquainted with the subject of ventilation; he should be aware of the fatal effects of the want of ventilation in great hospitals. The horses in transports become in a short time subject to inflammation of the lungs, or of the eyes, or to glanders; and the beasts in a menagerie have diseases engendered. Read Sir George Ballingall's chapter on Hospital Gangrene.]

There is a condition of the intestinal canal, natural during health and activity, that becomes highly injurious after an accident, which confines the individual to absolute and long-continued confinement. Hence the universal practice of evacuating the bowels in the commencement of attendance.

[Independently of the digestive assimilating processes, there is in

the stomach and intestines a principle of vitality in operation, which arrests all chemical change of the ingesta. But when the powers fall low, this influence being diminished, chemical decomposition takes place, and, following it, great distress. Hence the necessity of mild laxatives, which shall disburden the stomach and intestines without debilitating.]

If this be not attended to, the patient becomes restless and anxious; which ushers in fever.

Yet it must be recollected, that simple purging is very different from *critical evacuation*. Thus, when a vital part has been injured, and the patient has become restless, and anxious, and feverish, relief is to be obtained only by the intestines becoming active, and discharging large fetid stools.

[In reading cases, how often do you find this occur,—that the most violent symptoms cease on copious evacuations of dark and fetid stools? This is not mere evacuation of the intestines, but *a purging into them* of secretions which had been locked up.

Pathologists do sometimes confound the effects of accumulation in the intestines with that torpor which confines the natural secretions; attributing extraordinary cures to the evacuation of the canal, which are more justly to be ascribed to the restoration of the biliary and other secretions.]

Admitting, as we must, that irritation and disordered function of the intestinal canal produce very many local diseases of parts both external and internal, and also of the vascular and nervous systems, yet it is not mere remora or accumulation which is the cause; nor will the discharge of feculent matter be the cure. The cause is often a disturbed function of a portion of the alimentary canal. And this consideration opens another subject of study, the influence of particular purgatives and alteratives on the mucous surface of the intestines. See *Neuralgic pain*.

Towards the termination of some surgical cases in death, there is an atony, a want of tone, of the hollow viscera, attended with flatulent distention, in which condition, if active purgatives be given, they destroy the patient.

[For example, if cold saline purgatives be administered with the idea of procuring stools, instead of carminative and stomachic purgatives, and enemata of assafœtida, and medicines to give strength, the belly becomes more tympanitic, and the patient sinks.

When the constitution is influenced either by a wound or by local disease, "universal sympathy prevailing," distinct systems, as well as different organs will become affected; *e. g.* 1. The sanguiferous system.¹ 2. The nervous system.² 3. The whole digestive apparatus.³

[¹ Shown by the action of the heart and arteries—the temperature increased—fever.

² Shown by vigilance, delirium, or convulsions.

³ By the symptoms above enumerated.]

Thus, a wound of the head, or an irritable ulcer, will produce symptoms not readily traced to their true cause.

[See Erysipelas.]

In all those cases there is a sudden influence of atmosphere, its temperature, moisture, pressure, and unknown qualities. The season of the year, the wind that prevails, the soil over which it blows, have an influence on the constitution, which must be studied by the surgeon who has to conduct a tedious cure, when a wound has been received or an operation performed.

A surgeon at home is apt to forget these effects, but he cannot fail to notice them in the camp. He sees trifling wounds become formidable; sloughing sores, and slight injuries mortifying; not one but many suffering. Then he looks around and thinks of the prevailing disease,—what fever or dysentery is common? The remedies for these are the means of supporting his surgical patients; for although in them the disease be not recognisable by symptoms, yet the influence is upon them retarding recovery.

[A case of tetanus may occur and leave us in the dark as to the cause; but if an army sit down to besiege a town, and every case of amputation, every case of wound, even to the bleeding with the lancet, terminate in tetanus, the cause cannot be mistaken.]

Thus is the knowledge of medicine the introduction to surgery, and a liberal knowledge of the science necessary to the art.

[The blue pill and the bitter draught are not the whole of medical practice necessary to surgery; nor the mere succession of purgatives the universal remedy. There are other conditions to be studied besides that of the London alderman, or the porter-swilling drayman. This is more especially to be considered, if your duty call you abroad. In Europe, in the Mediterranean, in the East Indies, in America, and the West Indies, the *epidemic* is to be recognised in the retardation of the process of cure. This knowledge will be found in the works of Pringle and Blane, of Dr. John Hunter (an ingenious man, but not Mr. Hunter), of Dr. Jackson Lind, &c.]

You now comprehend how a slight operation proves fatal, and how sometimes a rash fool succeeds; all depending on the unrevealed state of the constitution. What, then, are our duties to our patient, in order to insure success?

[Before an operation is performed, you would do well to look to the eye, the countenance, the condition of the skin, the regularity of the evacuations, and the state of the secretions. If, by acquaintance with his constitution or condition, you have learned that a leech bite or a blister has been followed by erythema, you would do well to conquer this disposition of the system. The day preceding an operation you give a warm purgative.¹

¹ For example:—

℞. Pulv. Rhei,	
Magnes Carbon.	a ʒi.
Tinct. Sennæ,	
Tinct. Cardamom. Comp.	a ʒi.
Aquæ menth. pip.	ʒxx. ft. Haustus.

If the bowels be habitually loaded for some days, you order small and largely diluted doses of the sulphate of magnesia, with air and exercise.

If the secretions are deranged, undeblilitating doses of the pil. hydrarg.; or of the pulv. hydrarg. cum creta. With a morning draught of rhubarb and sulphate of potass.

Read Abernethy's Local Diseases, p. 92.

Read Dr. Plummer's Essay, in Med. Essays of Edin.]

Again, there can be no division of cases. The business of the physician and of the surgeon is the same. There is no true division of diseases into *internal* or *external*; or into *general* or *local*:—Nor can you decide on the treatment of the disease of an *organ*, without considering whether it be primarily affected, or secondarily; that is, whether it result from a reflected influence from the state of constitution.

[It will not be imagined that, after the life the author has led, he can desire to throw disdredit on *morbid anatomy*; but, by poking in the dead-house, we shall not discover the sources of disease. We are informed to what disorder of organs the disease tends, and the source of formidable symptoms, but not the cause from which these mischiefs spring.]

In conclusion,—in all surgical complaints, and in all cases of operation, study that your patient breathe a pure atmosphere and enjoy tranquillity of mind; preserve the skin clean and perspirable, by medicine, tepid bathing, and the flesh-brush. Let the diet be varied, but simple; and the bowels active and regular, without irritation, and the dejections of a natural colour.

[Prosecute this subject under the different heads; e. g. The treatment of Phlegmon—of Erysipelas—the conditions of the body when subject to ulcer, &c.]

CHAPTER II.

INFLAMMATION,¹ AS CONSEQUENT ON WOUNDS AND OPERATIONS.

I shall not consider inflammation as a disease, for that would carry us at once into all the intricacies of the subject; but simply as that excited action which takes place in a healthy body when suffering from external injury.

¹ To treat fully of this subject would be to transcribe the lectures; to treat of the structure and action of arteries; the forces circulating the blood; the condition of the blood out of the body, and in it. So that under this head might be embraced the whole of surgical pathology and practice.

The reader will find an admirable introduction to practice in John Pear-

This puts aside those reflected influences which constitute disease.

[Inflammation attends all morbid changes, and if taken in its combinations, embraces the whole system of pathology. The simplest way in which we may approach the subject is by the question,—Does this excited vascular action tend to recovery and restoration? or does it participate in the morbid condition?]

Phlegmon is thus characterised. There is pain, heat, redness, swelling.¹ There is an increased quantity of blood in circulation, and increased activity of vessels.² This activity consists in an increased frequency of pulsation, an increased contraction and greater dilatation.

[Then it must be the combination of all these. We have exquisite pain without increase of vascular action, as in tic. We have morbid sensation of heat in the stomach, anus, urethra. We have burning sensation on the skin, without either inflammation or actual heat. We have redness in the flush of health, and in the natural excitement of a part. We have swelling from œdema, indicative of weakness and not of inflammation.

² The anatomist seeks an inflamed part, that he may succeed in a minute injection. The surgeon cutting into inflamed parts sees the blood flow with greater impetus. The microscope (when you take precautions against evaporation) exhibits an increased current of the globules.]

The accompanying fever resembles the idiopathic inflammatory fever. It comes on with less distinct announcement. Perhaps the patient is chill, and vomits. The pulse is frequent, full, and strong. He is restless and vigilant. The secretions are diminished.

[That is, the skin is hot and dry; the mouth parched, with thirst and loss of appetite; the urine is less copious, and high coloured.]

The blood drawn coagulates slowly; the coagulum is firm, and has the buffy coat.

If there has been extreme violence, there is faintness, convulsions, or delirium.

If the system is recovering from the shock, the symptoms will abate about the third day, and the secretions will be re-established.

Taking this as a general statement, the patient's condition may be influenced by many circumstances; by age, constitution, and situation;¹ by the part injured or affected;² and the danger will be in proportion to the importance of the organ or the delicacy of its texture.³

[A country man with a fractured limb is in a more hopeful condition than a pale artizan laid in hospital.

son's Principles of Surgery, and in the first hundred pages of Mr. Abernethy's lectures.

After hearing lecture, he will peruse with advantage Dr. Thomson on Inflammation, and Mr. Hunter's great work, which I place last, although it be the ground-work of all we know, and in which the art is founded on just principles, and brought into alliance with science.

*The relation of organs to the general system will produce an alteration of symptoms. The stomach being the seat, there will be oppression, dejection, and a pulse low and quick. The pulse, in inflammation of the intestines, will be small and quick. The heart and lungs will exhibit the contrary extreme. The symptoms will vary as the brain, the eye, the joints, the bone, are affected.

³Common sense dictates that if inflammation be left to run to effusion or the deposit of coagulable lymph, when the brain or the eye is affected, permanent loss of function must result.]

Every person has some peculiarity of constitution, which influences the general symptoms.

[A strumous, syphilitic, or rheumatic action, may be excited by a blow, or by an operation. So the fever which is excited, as in idiopathic inflammatory fever, may assume a new character, as nervous, gastric, or dysenteric.]

The universal sympathy brings some remote part into corresponding activity; and the supervening local affection mingles its influence with the original symptoms.

[The common expression "the weak part" is not amiss; constitutionally weak. Thus, the operation of amputation may destroy the patient, by exciting inflammation of the lungs. Thus is the hand of the surgeon arrested in a case of fistula, when the patient has morning expectoration. But not the lungs only, other organs also, as the liver, (especially in warm climates,) the kidney, the bladder, and prostate, the mucous surfaces of the stomach and intestines, may be excited into disease from a prevailing inflammatory condition of the system, consequent on injury; or after a formidable operation.

See Quesney, tom. i.; Mem. of the Paris. Acad.; Desault on Wounds of the Head; Baron Larrey.

Obstructions, engorgements, and enlargement of viscera, may follow the symptomatic, as they do the idiopathic, fever.]

The phlegmonous inflammation has its stages,—adhesive, suppurative, and ulcerative.

Inflammation (phlegmon) terminates in resolution; in adhesion; in suppuration and ulceration, in mortification. It may terminate in chronic inflammation; in hypertrophy; in atrophy.

[Thus, it not unfrequently happens, that in inflammation of the testicle, instead of its simply subsiding with a diminution of tumour, the absorption proceeds to the wasting of the gland altogether.]

We desire that it may terminate in resolution; in other words, that it may gradually subside; and to this condition we endeavour to bring it by the following means.

General Remedies.

On this subject a few remarks may be useful. In all severe accidents, after all serious operations, watch the first symptoms of an attack upon the lungs. You take the common precautions

against raising inflammation, by avoiding solid food; by acidulated drink and effervescing draughts; by antimonials; by sponging in dryness of the skin, and feverish heat; and all the usual attentions to cleanliness, ventilation, and repose. When you use the lancet, take the firmness of the coagulum into your consideration as much as the buffy coat. If the coagulum be flat and easily broken, have recourse to other remedies than bleeding. Learn to judge of the pulse, which is always to be taken in conjunction with the state of the blood.

[Learn to distinguish the condition of the pulse,—as strong, frequent, hard, quick, vibratory; and these, as contrasted with soft, compressible, slow. Attend also to the colour of the blood as it flows, red or florid, viscid and thick. The buffy coat attends local inflammations; the serum is limpid, and in small quantity.]

The pulse will sometimes rise from bleeding, as in inflammation of the viscera.

It will throb so as to deceive you, when fatal consequences will attend further depletion. Be careful to avoid the mistake of taking irritation for inflammation. In general, inflammations attributable to morbid states of the system do not bear bleeding, as that inflammation does which follows a wound or surgical operation.

There is a *jar* indicative of irritation after the inflammatory strength has been subdued.

You bleed in the young and robust, in circumstances where you would avoid it in an older patient.

You consider the organ which is the seat of inflammation.

[Thus you bleed freely in case of inflammation of heart or lungs, or brain or eye.]

You are careful to take into account the nature of the accident; the tedious time required for recovery; remembering that, when the excitement is over, the powers of life fall low, and that you may have to regret that you reduced the strength so much.

Local bleeding is always safe.

Purgatives.—These succeed to bleeding as the means of relieving over action, viz. by watery stools.

[Proceed through the neutral salts and their combinations, viz. the red mixture of the hospitals, the black draught, &c.; or you employ calomel, jalap, and James's powder.]

What, then, is to be done when you dare evacuate no farther? Have recourse to antimonials; join them with the saline purgative, or with mercury.

[You avoid full vomiting, unless in particular cases as in swelled testicle. Mr. Pearson longed to have a cure for inflammation that would not debilitate; we have it in antimonials. They subdue the pulse and soften the skin, without permanently taking away power.

Mercury is a powerful remedy in checking inflammation; it is used when we dread the deposit of coagulable lymph on delicate textures; e. g. the brain, the eye, the larynx. It joins well with opiates.]

Opiates must be used only after evacuations, or when the

strength is subdued by long suffering. They are best joined with relaxants, as ipecacuanha.

Local applications.—Do not use counter-irritants in acute inflammation; reserve them for the chronic stage.

Use evaporating lotions.

[Sometimes iced water, as in compound dislocations. Teach yourself how to use syphon threads, to secure a continual flow of cold water over the inflamed surface. Or you prescribe the lotion of *cerussa acetata*, or of the *muriate of ammonia*.]

Avoid this, however, in all critical phlegmons; nor in that case use any repellant, nor attempt resolution. In all constitutional affections, prefer tepid anodyne applications to cold.

[In *hernia humoralis* you would do well to prefer tepid applications. Cold is bad on the general principle, and causes a painful contraction of the cremaster muscle.]

It will happen that you have inflammation rising from a severe accident, in a constitution exhausted by dissipation. Your patient does not sleep; he has a worn-out appearance; he is fidgety; answers incoherently; rises from bed in the night; becomes violent. Then will these evacuants and refrigerating applications prove of no avail.

[Then employ emetics and opium, and these failing, you may be forced to have recourse to stimulants, porter and gin! Here take up the subject of *delirium tremens* from your medical authorities.]

As I have purposely limited the consideration of inflammation to the reaction after external injury, it is necessary to advert to the most distressing and formidable case; where there is prostration without reaction. Thus it happens; the patient is seized with bilious vomiting, becomes restless and agitated; sleepless; wanders and mutters; not the part injured, but a remote part, swells, and exhibits erythema; becomes gorged; mortifies and sloughs; and the patient sinks, without manifesting the symptoms of inflammation or of inflammatory fever.

[Something similar to this condition will attend inflammation of the veins, as after amputation.]

The subject continued under Adhesion, Abscess, Wounds.]

CHAPTER III.

ADHESION.¹

Of what are called the terminations of inflammation, we consider adhesion as a process of health, and embracing much of practical importance.

¹ We must reserve for lecture what is called the history of adhesion; the experiments of Hunter and Du Hamel; the operation of Taliacotius; the operation of amputation, &c.—See Mr. John Bell's Works.

When there is a division of the integument or muscle, a process is set up which terminates in the reunion of the cut surfaces. When the wound reunites without suppuration, it is called *adhesion by the first intention*.

[It is hardly a fair question to ask, How soon does adhesion take place? If we mean, when does that sympathy take place between the living surface, we may answer, immediately. But the firm junction requires time; an inflamed intestine will be found adhering in seven hours; the lip in twenty-four hours; in amputation, the flap will be found adhering in three days.]

To this process of adhesion, a certain degree of inflammatory action is necessary. It is seldom, however, that we have to promote the action; but on the contrary we have to moderate it.

[The term used by Mr. Hunter, *adhesive inflammation*, may mislead, as implying the necessity of an excited action to the happy result of our operations. But the injury committed, the mere division of the part, is sufficient stimulus to the body in health. In the secondary process of adhesion, we may require to stimulate the system or the part.]

The blood-vessels of the divided surfaces throw out blood; the hemorrhage ceases, and serum flows; the serum gives place to coagulable lymph, which becomes the medium of union.

[Mr. Hunter has said the medium of union is blood. Do not let this opinion make you careless as to the coagulum remaining between cut surfaces; for it will disappoint you, and lead to suppuration, and not of a good kind. You are, therefore, in all wounds, and where you desire immediate adhesion, to clear away the blood; and in stabs and dirk wounds, the practice has obtained to suck out the blood. See the old practice in the armies of France, J. Bell's Principles of Surgery.]

As soon as the surfaces have ceased bleeding, they are to be brought together for adhesion. If they are not so united, and the wound remains gaping, another process is begun; the coagulable lymph becomes organised, and through it pus is secreted, and by-and-by granulations arise. This marks the period for *secondary adhesion*.

Instead of indulging in the idea of "*procuring*" adhesion, see that you do nothing to retard or impede it. It is a natural process, which will complete itself. You have, however, a very obvious duty, to keep the parts together and at rest, and to preserve the health.

[To guard against disease. Now it happens thus: the operation is performed—adhesion begun—but the patient is irritable, has a cold shivering, with increasing heat in the part—fever is established, and next day you find the lips open, and suppuration established.]

When adhesion has taken place, the sympathetic fever subsides; the inflammation terminates.

[Hence the beneficial effects of temporary and even partial adhe-

sion, as in amputation; you surmount a period of peril from excess of action. See Penetrating Wound.]

The means of procuring adhesion, therefore, are mechanical; to relax the muscles, which your anatomical studies enable you to do; to draw together and retain the surfaces in contact; and to enjoy perfect rest.

[The means being the *adhesive strap*, the *dry suture*, the *uniting bandage*, the use of the needle (*Sutura cruenta*).

All that regards dressing should be studied in the hospital. But from the bad taste (to give it the mildest term) which prevails, and which tempts surgeons to contend against time, and therefore to have the patient soon off the table, the dressings are huddled on, or deferred. Surgeons of public institutions owe therefore a public duty,—to serve the poor, but also to be an example to their younger brethren, that right methods may be taught. The dressing of a patient after an operation is very often the most important part of the office of a surgeon, and any thing like hurry the most dangerous lesson. This observation I was tempted to make long ago, after being prevailed on by Mr. Abernethy to neglect my brother's precept and example. Mr. Abernethy assisted me in my operation. I object to what he has laid down, p. 200, sect. 10, Lectures.

The adhesive plaster should be so applied as to avoid retaining discharge; either a little apart, or snipped so as to open in the centre (*fenêtre*). The dry suture is a large piece of adhesive plaster, with eyelet-holes and ligature attached; the plaster being laid on the sides of the wound, and the threads tied across. Ligatures put through the integuments with the needle are to be avoided when possible; where there is proper resistance they are not necessary. They must be used in the cheek, eyelids, abdomen, &c. A ligature to unite a wound should have two needles; they should be passed from within outwards. The ligatures should be supported in the interval by adhesive straps, so as to take off the strain of the swelling integuments. For the quilled suture see the *torn perineum*. For the application of the compress and double-headed roller, see Wounds. In dressing, one strap should be taken off, and another put to replace it, and so in succession: when all are loosened at once the new formed adhesions are torn up.]

Study the subject under the head of Hare-lip Operation, Ruptured Perineum, Amputation, &c.

Preventing Adhesion. Procuring Adhesion.

It is very often the object of the surgeon to prevent adhesion, or to prevent the consolidation of the cellular membrane under inflammation, which is a species of adhesion.

[As in phimosis and in imperforate vagina.]

He has a difficult task who has to effect this in the case of burns.

[The *cicatrix* (see Ulcers) is attended with a contraction and consolidation of the cellular membrane, by which its elasticity is de-

stroyed. It is this compact or solid state of the integument which causes those distressing contractions after inflammation, and especially that action which is induced by burns. You will have to employ this property against the disposition; that is, you will have to induce cicatrisation in one direction, in order to oppose the tendency to it in another. See an ingenious paper by Mr. Earle, *Med. Chir. Transac.* See operations on the eyelids, &c., also the operation of closing fistulous openings.]

You have on many occasions to excite the process of secondary adhesion; as when the natural passages have been opened by sloughing or phagedæna; the trachea divided by the suicide; the perineum ruptured in labour; and urethra opened in fistula.

When by paring the edges, and the use of sutures, you fail, you may still succeed by inducing granulation.

[You touch the edges with the caustic, dress with the cantharides ointment, and cover all with a poultice. Thus by hot, stimulating, and balsamic dressing, you bring the edges into the state of suppuration and granulation. Then peeling off the thin cuticle from the granulations, and making a bleeding surface, you once more employ all your mechanical means to keep the surfaces in contact. I have succeeded by a slower process; a more striking imitation of the process of adhesion after burns. Sometimes by the use of nitric acid; sometimes by laying a hot wire in different directions on the mouth of the opening, so as to induce a gradual process of condensation and contraction.]

CHAPTER IV.

SUPPURATION AND ABSCESS.

Suppuration is another form of action in the animal body tending to restoration.¹ We have anticipated its condition in a cut or open wound.

The surface thus exposed throws out coagulable lymph; pus is secreted through that film, and being thus covered and protected by secretion, granulations are formed. These sprouting fill up the gap, and cicatrisation completes the regeneration.

Deferring the subject of granulations, (see *Ulcers*), some observations are called for on that of pus.

Of the authorities on this subject, we are chiefly indebted to Dr. William Hunter, who taught us that ulceration was not necessary

¹ Acknowledging our obligations to Dr. Senac, Dr. Simpson, Dr. William Hunter, De Haen, Dr. Morgan, Mr. Hunter, Sir Everard Home, and Darwin, on this subject, we may *here* limit our observations to what is strictly practical.

to the formation of purulent matter, but that it may be secreted from mucous and serous surfaces.

[How important to know that purulency in the sputa is not necessarily implying vomica; that the matter of gonorrhœa does not imply ulceration in the urethra! The great merit of Mr. John Hunter has obscured the less brilliant, but not the less useful labours of the elder brother.

Remember—that to be ignorant of the merits of these two men, is to be negligent of the honour of the profession, and ungrateful for the benefits you have received.]

On a mucous surface, we perceive the change soon after inflammation has taken place; the secretion is no longer cohesive, tough, or viscid; no longer difficult to mix with water; from transparent it becomes of a yellowish colour, and fluid; and now, if examined, globules may be observed.

[Suppose that you have to describe the condition of a discharge, perhaps in consultation, these are the principal distinctions. Good pus is like cream of equal consistence, and inodorous; then it may be unequal and curdy, or serous and thin; or thick, viscid, and slimy. (See Scrofula.)]

A certain degree or stage of inflammation is necessary to the secretion of pus. Violent inflammation, as well as defect of action, will cause it to cease.

[That pus is a secretion, we conclude from these circumstances—
1. It partakes of the specific action. 2. It undergoes the changes incident to other natural secretions, as in fever. 3. It participates equally in the effect of mind. 4. Its varieties are produced by a change in the inflamed vessels.

From these considerations are drawn some not unimportant practical deductions.

A child having a habitual discharge from the ear; a man having a gleet which is suddenly suppressed; the pain and dangerous consequences are attributed to the suppression, when they ought to be attributed to the increase of inflammation,—to a degree of violence of action inconsistent with the secretion of purulent matter. The practice of leeching and fomentation is obvious.

On other occasions, as in wounds and ulcers, the secretion must be re-established by wine, bark, and stimulating fomentation.]

The suppurative action takes place more readily in superficial parts.

[This fact explains much. The suppurative action and ulceration taking place towards the surface, explains how abscesses burst outwardly,—how foreign bodies, as balls, work to the surface, It is for the same reason, that the lips of a wound may have gone through the action of suppuration to secondary adhesion, whilst yet the bottom of the wound is an abscess. This, of course, must be cared for in the dressing.]

Abscess.

Abscess is a preternatural cavity containing pus; a process of inflammation.

[Pus in any of the natural cavities is not called abscess, and for sufficient reasons; an abscess has a peculiar structure, and undergoes certain specific changes. Empyema is not an abscess.]

We distinguish *acute*, *chronic*, and *critical* abscess.

An abscess forms in the cellular membrane; and we must attend to its formation and its structure.

[If a limb be violently inflamed, as, for example, from gunshot or compound fracture, and abscesses form, they will be found in the great beds of cellular membrane. If the constitution should tend to the secretion of pus and the formation of chronic abscess, they will be found in the great deposits of cellular membrane about the trunk of the body, wherever the texture is most loose.]

The first process is an increase of the natural secretion into the cellular membrane.¹ Then coagulable lymph glues the cells so as to circumscribe the deposit.² At first there is a whitish fluid secreted; it changes into pus, and increasing the part, is distended; the sides consolidate, and the abscess is established.³

[¹ From this secretion of serum comes the œdema, which precedes abscess, and announces it to the intelligent practitioner.

² Proper, however, to the phlegmonous abscess.

³ When the abscess is first established, it is often traversed with filaments, in part vascular, in part the remaining cellular tissue. In time these are absorbed or melted, but often the shreds of cellular membrane are left insoluted and sloughy, in the centre of the abscess.]

The structure of the abscess, so to speak, is this. The external wall is thickened cellular membrane; it is lined with a smooth ash-coloured substance, a formation by the coagulable lymph which has become organised; from this surface the pus is secreted.

The presence of matter, and the formation of an abscess, is preceded and accompanied by certain signs; there is pulsating pain, heat, swelling, with irregular shivering.

[When phlegmon and sympathetic fever are present, and there occur *rigors* or cold shivering at irregular intervals, they announce a change. They may mark the accession of fever, but they may be the mere effects of exposure and cold. They will often indicate to you that you have failed in procuring adhesion, and that you may, therefore, change your practice.

If you have been interfering with any of the natural passages, by bougies or otherwise, the shivering may be attributable to that operation.]

It would appear that the *rigors* are attributable to the distention and the formation of the cavity, as the matter on an extensive open wound is not attended with the same effect.

An abscess is not only resembling a natural part in its structure, but in this also, that its contents change, and undergo absorption and deposition; in a manner similar to the natural secretions into the cavities, and so sometimes after the matter is formed the abscess disappears.

[It is sometimes recommended to open abscesses by caustic. In doing this, I have found the abscess disappear! an excitement being given to its walls, and absorption the consequence. So blisters, although used to accelerate the process of thinning the wall and pointing, do sometimes dissipate the abscess; and so in more chronic cases, electricity is used for a similar purpose.]

When the abscess becomes prominent, and is about to burst, it is called *pointing*.

[The pointing of an abscess is caused first by the consolidation of the sac with the skin, and the absorption of the intervening substance; thus incorporated, they waste, inflame, and ulcerate.]

When the prominent point of the abscess has ulcerated and burst, and the matter is discharged, there is remarkable relief; and when you revisit your patient, you no longer see the flush of inflammatory fever, but you may still expect irregular rigors, loss of appetite, and peculiar paleness of the skin.

An abscess requires to be opened sometimes, and in particular situations early opened.

[An abscess requires to be opened when under a fascia, for that membrane, possessing little vascularity, will long resist the progress of the matter outwardly. You open an abscess near the rectum, lest the matter should extend into the cellular membrane. So when an abscess forms about the throat, we open it, lest it ulcerate towards the irritable portion of the glottis, in which case it is apt to suffocate. See Scrofulous and Cutaneous Abscess.]

The abscess thus having run its course, or being opened, and by that means accelerated, you have to guard against the formation of a sinus.

[This you do by renewed attention to health. You take care that the matter has free exit. Then you perceive the cavity to granulate and fill up.

You may have to desire the suppurative process, and the formation of an abscess; in which case you moderate the inflammation—diminish pain by opiates, joined to bark and wine—you steam the part, or apply fomentations and the maturing poultice—the flannel bag, with chamomile flowers and poppies—and in the poultice the resins and the warm gums. In the more chronic abscess, the gum plasters are applied.]

There is a field of observation open between the two subjects of acute and chronic abscesses.

Thus deep suppurations form,—in part owing to the general diathesis, in part depending on some local irritation which directs the action.

[1. For example, diseased bone causes an abscess in the neigh-

bouring cellular substance. 2. Irritation in the rectum causes abscess by the side of it; such, too, are the abscesses about the throat. 3. Peritoneal inflammation causes suppuration in the abdominal walls. 4. Inflamed intestine abscess, and at length fistula in the side. 5. And most frequently of all, an inflamed lymphatic gland produces abscess external to itself, and in the surrounding mass of cellular substance. 6. And, lastly, the milky abscess, proceeding from distention of the milk-vessels in a delicate or strumous frame.]

The following I should have thrown with other subjects into an appendix, but it will serve to show how abscess varies by slight circumstances.

*Whillow.*¹

It is a phlegmonous tumour, occupying the end of the finger, attended with excruciating pain.

[I have conceived it to originate in an inflammation of the vascular body which secretes the nail. The painful consequences are certainly resulting from the nature of the covering, and consequent confinement of matter.]

When not subdued, the whole hand and arm may become affected with pain and tension, and the artery at the wrist throbs powerfully. The lymphatics participate in the irritation, and there is pain in the axilla.

[In this miniature representation of inflammation and abscess, you have an example of what may befall from apparently slight causes. *Erythremus, delirium, lipothymia*, (animi deliquium)—from disease in the point of the finger!]

As to treatment, first distinguish the varieties. In strumous subjects, you have the—

Paronychia sicca, a swelling encircling the nail, which does not suppurate.¹ There is a *venereal paronychia*.² There is also a mild form of disease, which is a mere inflammation of the sensible extremity of the finger, the organ of touch.³

[¹ Foment by dipping in hot water, and so you may in the commencement of the more troublesome form.

² Whether this be a true venereal symptom, or a consequence of a cachexy so induced, may admit of doubt. The progress of the complaint is slow. The matter loosens the nail, and there is a deep, foul, very painful ulcer; the bone often becoming carious, whilst the integuments of the finger swell with a peculiar firmness of texture.

³ In which case you take care not only to let out the matter, but you must pare away the thickened cuticle, else the matter will continue to burrow under it, and to produce successive inflammations.]

Distinguishing the varieties, the phlegmonous and suppurating

¹ Paronychia, Panaris, or Whitlow.

whitlow requires active treatment; you must give freedom to the matter, and destroy the rising fungus.

[When the matter is deep, says an old surgeon, there is no alternative; place the patient's hand on a mass of tow, hold him firm, and with the scalpel cut to the bone! All I have to say is, that it may be done effectually, and with less pain, by passing inward a fine sharp bistoury, and cutting outward. Cut away the nail; touch the ulcer, and especially the very sensible fungus, with the blue-stone, and, according with the old advice, dress with the balsam copaibæ and tinctura thebaica.]

Chronic Abscess.¹

In this abscess there is less phlegmonous inflammation—less action of any kind. It partakes of the constitutional peculiarity of struma, or it is attendant on an exhausted system. In short, it partakes more of disease than of the mere effect of injury in a state of health.

The chronic abscess forms in the great masses of cellular membrane about the back and loins. It is attended with slight inflammation,¹ and often, instead of being surrounded with a "stool" of adhesive and coagulable lymph, the matter drops from cell to cell, and appears externally at a part remote from the commencement of the disease.

[¹ Which gives occasion to some to express the opinion that purulent matter may be formed without inflammation.]

This character of abscess gives rise to mistakes; the absence of fever and of local inflammation inducing the surgeon to believe that there cannot be pus contained in the swelling.

[Thus I have seen a surgeon commence his operation to *extirpate a tumour*, when the knife entered an abscess; so we have sometimes a difficulty in distinguishing a chronic abscess about the shoulder from an enlarged bursa.]

Large abscesses require very particular treatment; and for this reason, when a large abscess is opened, there arises alarming symptomatic fever, which is dangerous in proportion to the extent of the surface of the cavity. This effect arises from the inflammation of the puncture extending to the whole interior surface, which is aggravated to a violent degree by a new cause, the putrescence of the remaining matter, for, by the admission of air, a chemical decomposition is permitted.

[When you puncture an abscess, lay the flat head of your probe on the side of the lancet, and hold them firm. When you have penetrated to the matter, by a motion of your thumb introduce the probe further, and withdraw the lancet; or you may use the direc-

¹ Read Abernethy on chronic and lumbar abscesses, in his *Surgical Observations*.

tory in the same manner; the groove of that instrument serving the purpose of a canula.

A grooved needle is employed for exploring a tumour in which the surgeon is uncertain whether there be matter contained or not.

The use of the probe or directory is to permit the matter to flow, and to prevent the necessity of much poking in the wound, which makes the union of the puncture uncertain.]

If the abscess be small, the opening is made free, and a poultice applied; but, if large, you must puncture only, and procure adhesion of the lips, and thus avoid reaction and fever.

[Some surgeons neglect the practice of Mr. Abernethy, and reject his reasoning; in which, I think, they are very wrong.]

In this operation there is both nicety and judgment required,—nicety in the dressing to procure reunion, and judgment to say when the attempt should be resigned, and large incision substituted for puncture. (See the treatment for compound fracture.) The operator often fails in procuring union by not supporting the sides of the abscess: first bring the lips very accurately together, seeing that no clot or coagulable matter is between them, and no fat protrudes. Apply your adhesive plaster neatly; over that a compress, and over that a longer and broader adhesive strap: then use the compress of lint, and the uniting-bandage (a double-headed roller), so as to prevent the matter accumulating and distending the walls. You will be repaid by the constitution suffering no disturbance.]

After a time you repeat the operation; and perhaps a third time. The abscess being diminished in size, it is finally opened to remain so.

The abscess may be opened by caustic.

[Authors do not seem to know the intention of this mode of operating. The caustic may be used with the view of exciting the abscess to activity, as well as to open it by a slow process of sloughing. But it is used with a very different intention. When the caustic has been applied, and the wall deadened, the lancet is used to perforate through the dead part. The effect is to evacuate the matter, whilst there is time given for the contraction of the abscess, before the slough caused by the caustic separates by ulceration, and consequently before the irritation of the wound is propagated to the walls of the abscess.]

If possible avoid the use of setons.

[Although some deride the idea of depending orifices being of use, it is often necessary to make a counter opening. This may be done by passing the gunshot probe, and cutting upon it, or by using the instrument of Assalini.]

There is some very ignorant writing on this subject. In the first place, a seton is not required for an abscess, unless there be irregular openings into the neighbouring parts. It is used to maintain a free discharge in one direction; whilst the compress and roller is employed to procure adhesion in the recesses or sinuses of the cavity. A touch with the *kali purum* in the lips of the orifice

will do the office of the seton, if it be intended merely to keep the orifice open.

This pressing out of matter from sinuses and preventing it falling down in the loose cellular membrane, was intended by the older writers by the use of the *fascia aposthema faciens et prohibens*. Cases will occur where you dare not use the roller, and yet have occasion to support the limb against œdema, or gently to express matter. This is to be done by adding a portion of the *emplastrum plumbi* to an ointment, and spreading it on slips of linen: these are put obliquely round the limb one over the other, always taking care to make equal pressure, and not too much.]

In treating abscesses, and with the intention of preventing them falling into obstinate sinuses, you must have recourse to your knowledge of anatomy, in order to keep the parts perfectly still, for very often spurious sinuses are kept open by motion, and friction of the parts.

[Thus I have found an abscess under the latissimus dorsi, and under the trapezius, kept open by permitting the motion of the arm. Mr. J. Bell was wont to narrate a case of fistula under the pectoral muscle, which had not yielded to injections, setons, compresses, &c. cured by the necessary bandaging on the patient's breaking his arm. When there are abscesses in the temple, it is necessary to keep the temporal muscle at rest by binding up the jaw. Sinuses after bubo in the groin are, in like manner, kept up by the motion of the part, and cured by strict rest, compress, and bandage.]

Of the Hectic.

The hectic fever is that which accompanies local irritation, especially suppuration.¹ It is characterised by flushing, frequent weak pulse (from 100 to 140), night sweats alternating with diarrhœa.²

[¹ When the paroxysm first appears, you cannot yet form a judgment; but you look anxiously for a swelling or tumour.

² A hectic most resembles a quotidian intermittent: the exacerbations are irregular; the chilliness and the sweat recurring irregularly.]

When the fever is confirmed, the patient loses flesh perceptibly; he is pale and debilitated, and without appetite; the urine copious, the mouth moist, and the tongue clean.³ The judgment is always clear to the last.

[³ Preternaturally clean and bright on the edge.]

Such being the character of hectic, you become alarmed when there is paleness and emaciation, and increased heat after meals. The danger may be estimated by the nature and extent of the local disease.

Surgeons may be permitted to use the grand aphorism, *remove the cause*, for on that all will ultimately depend.

[When the surgeon can remove the cause, as by amputation of

a diseased joint, it is wonderful to see the effect. The patient for the first time after months of suffering sleeps calmly, and often colliquative sweats and purging cease at once and altogether.

It is superfluous to fill a surgical work with the treatment of hectic fever. It is sufficient to say, that we must watch and check the perspiration, and watch, too, that we do not throw the action on the bowels; that we nourish with light food, and support with appropriate tonics.]

CHAPTER V.

ERYSIPELAS.

The human frame, by diet and restraint of action, by influence of atmosphere, and disturbance of mind, is generally removed from a condition of perfect health. Thus we become subject to an inflammation, which no longer partakes of the phlegmonous character; "that is to say, it is no longer the reaction of a body in health," or an action "tending to restoration." *Erysipelas* is "an exantheme."¹ It is, however, an inflammation of the skin, depending on constitutional derangement.² It is characterised by a bright red, partaking of a lake colour, and tinged with yellow, which becomes more evident in the progress of the complaint. The swelling is slight without induration. The colour disappears on pressure. It is always preceded by symptoms.³ The inflammation is not limited; it extends irregularly. The heat is peculiar, and attended with a prickling pain like that of a scald, or from exposure to the sun. The inflammation properly in the skin, extends an influence to the subcutaneous cellular membrane.

[¹ An objection perhaps to this may be, that exanthemata are contagious diseases, *et semel tantum afficientes*. It is doubtful if erysipelas be contagious.

² We can produce phlegmon—why can we not produce erysipelas? Is this not a proof that it depends on some state of constitutional disturbance?

³ In going round the hospital, and seeing an erysipelatous blush round your patient's wound or ulcer, you will find on questioning him that he has felt unwell,—uneasiness in the epigastrium—bitter taste in the mouth—pain in the sockets of the eyes; and if he has not observed these, he will tell you of chills or shivering in the preceding evening. If he has been moving about, he will confess to heaviness of the limbs, loss of appetite, and headach and nausea.

You observe the distinction to phlegmon—here the general distress precedes the local affection. A dissipated life renders the

individual more subject to erysipelatous inflammation on receiving a hurt, especially an abrasion or puncture of the skin.]

Distinctions are made, as the *acute* or *phlegmonous*, the *œdematous* and *gangrenous erysipelas*.

[Erythema, simple erysipelas, and phlegmonous erysipelas, are degrees of the same affection. To study this subject fully, the student ought to peruse his medical works, and return to these considerations.]

Erysipelas of the Head.—Whether it be idiopathic, or consequent on wound or puncture, when a fiery redness extends from the scalp to the neck, and the face is swoln and the eyelids closed—

1. You think of the typhoid character of the fever; 2. Of the danger to the brain (a weak, rapid, irregular pulse, with a purple colour of the skin, will give token of the first—high delirium will warn you of the second;) 3. You will watch for suppuration in the eyelids, and use the lancet early, for if neglected, the matter will work wide, with sloughing and consequent disfigurement.

With respect to the forms enumerated above, are these distinct diseases? We find in one case, that it may assume in succession the acute, œdematous, and gangrenous form.]

The phlegmonous or acute erysipelas will be known by the higher degree of redness, more tumefaction, throbbing, with a fuller pulse.

In the malignant or gangrenous erysipelas, the patient exhibits more debility from the beginning, and the colour of the skin is dusky. When there is great œdema, there are also vesications.

[The slightest injuries will occasion an erysipelas, which shall be at once acute, œdematous, and gangrenous. Thus a man received a slight cut from an oyster-shell; in three days the arm was swoln from the knuckle to the shoulder—the skin was distended, œdematous, and with a granular appearance. In the mean time the face was flushed, and the eyes fiery—vesications—black spots, and finally, extensive sloughing took place on the arm.]

Again, it will present in this formidable manner: an operation is performed—the patient on a sudden becomes restless and anxious—he complains of diffused pains of the limbs—an erythematous blush appears on the surface of the wound, and extends irregularly to distant parts; it is of a florid colour like scarlatina, and in a few hours assumes a dark livid hue. In the mean time, the patient is talkative, delirious, with parching thirst.]

There is also an *erratic erysipelas*.

[*Erysipelas erraticum*.—We shall suppose a patient has hurt his knee, and that leeches are applied; a blush of erysipelas spreads from the leech bites up the thigh, and down the leg; there is a threatening of abscess; the early use of the lancet saves the skin; the erysipelas extends to the body, with more chills, and an increase of fever; the face is affected one day, the breast and loins the next; the symptoms by treatment become less violent, but still the inflam-

matory blush is shifting. In such cases the muriated tincture of iron is the best tonic.]

*Treatment.*¹—Be cautious in treating this disease as phlegmonous, for you perceive what the appearance of acute inflammation comes to.² Saline purgatives and antimonial are first employed, with warm diluent drinks.³ If in hospital, let him be shifted immediately into an open well ventilated place.⁴ When the tongue is foul and yellow, with a bitter taste and nausea, vomits are of service, with calomel and opium at night, and in the progress of the disease bark and acids.

[Remember that errors in diet and improper tight dressing are frequent causes of erysipelas, and that one of the most intelligent of our surgeons has declared the surgeon to be more in fault than the patient.]

² The application of leeches may be proper when the character is phlegmonous, and they may be applied to the inflamed part. It is true that leeches will produce erythema, yet they relieve in the acute form. Blisters have been recommended to stop the course of inflammation. I have not employed them; it is with more confidence recommended to draw the lunar caustic round the edge of the inflammation.

³ You give solution of the sulphate of magnesia (or the sulphate and carbonate together,) to which you add antimonial wine, and given in small doses every four hours, adding tincture of opium after the bowels have been relieved. The nicety of practice is to observe the diminution of power, and to change the practice to means which give support.

⁴ Yet not exposed to a cold stream of air, which, indeed, I have often seen bring on erysipelas.]

In slighter cases, you will find the chalk powder and cotton wadding the best covering. In most cases there is danger of the skin being isolated, and of a bad subcutaneous suppuration, or of mortification of the skin.

[Although the disease is essentially in the skin, effusion takes place in the subcutaneous cellular membrane. This is especially apt to be followed by formidable consequences when the skin covers extensive fascia, for then it becomes isolated, and falls off in mortification.]

It is therefore necessary to watch the first appearance of effusion, and to open the skin freely, using the scalpel instead of the lancet; otherwise the skin becomes undermined with matter and slough of the cellular membrane.

The propriety of free incision in erysipelas was first recommended by Mr. Copeland Hutchison, and enforced with great severity and decision by Mr. Lawrence.

[If the lancet is used early there will be no occasion for large incisions; nor blame yourself when you find no matter, but only serum. When there is œdema, there is the feeling of fluctuation,

but on puncturing only bloody serum is discharged, and tempted to go deeper, only blood.

Read Mr. Lawrence on Erysipelas, Med. Chir. Trans. vol. xiv. —a most learned paper. Read Mr. Copeland Hutchison on the same subject; Practical Observations on Surgery. Earle on Diffused Cellular Inflammation; London Med. and Phys. Journal. Mr. Arnott, *ibidem*.]

CHAPTER VI.

MORTIFICATION.¹

Looking, as we do here, directly to practice, and eschewing theoretical discussion, we say, mortification is one of the terminations of inflammation; but it is essential to observe, that when phlegmon terminates in the death of the part, there is an essential omission in authors; it is the effusion and infiltration into the cellular membrane which checks and hinders the action of vessels.

Take care that you distinguish *ecchymosis* and *thrombus* from mortification.

[A wheel passing over a limb often destroys the skin, while the parts beneath are alive. Extensive subcutaneous extravasation of blood resembles a complete mortification.]

Gangrene is marked by a decline of the vital powers, preceded by exquisite pain, and perhaps a burning sensation in the part; there is a subsidence of the tense swelling, and a substitution of œdema. Then appears a purple or livid spot, with phlyctænæ, or vesicles of a reddish fluid, and then emphysema.

When mortification pervades the limb, there is a dead weight, without sensibility or motion; the cuticle separates, and the smell becomes cadaverous.

When mortification comes upon a wound or ulcer, the surface becomes dry, and covered with a gelatinous tenacious matter. With these local appearances, the countenance exhibits anxiety,—then succeeds restlessness, wildness of aspect, and delirium; the pulse intermits; there is subsultus and hiccough—and coma!

¹ We might suppose that the death of a part admitted of no degrees; yet you find a variety of terms, and some of importance: thus, *gangrene* we may take as the progressive state; *sphacelus* the complete death of the part. Traumatic gangrene is intelligible enough, as that mortification which is proceeding from wounds. The humid and dry gangrene will be dwelt upon in the examples of compound fracture or gunshot, which certainly may terminate in gangrene, but not until tumefaction has taken place to an inordinate degree; then comes vesications and spots of mortification; the choking of the circulating vessels has previously caused debility, and imperfect supply of blood. See Aneurism.

[The humid and dry gangrene was a distinction of M. Quesnai. The first is when high inflammation is attended with abundance of extravasated fluid; the other is where there is no serum exuded, and the drying of the part prevents putrefaction.]

The dry chronic or idiopathic gangrene is the *gangræna senilis*. It is very often preceded by constitutional disturbance, restlessness and pain; there is no tumefaction. It commences in a small black spot on the side of the little toe; the skin becomes detached, and under this the skin is dark red; it dries; pain precedes the visible marks; then a purple darkness of the skin, which on the morrow is a mortified spot, and so the toes are in succession affected, and then the feet.

The cause is ossification of the arteries of the leg. But how frequently do we find these arteries ossified in the dissecting room without any such consequence? This informs us that there must be another cause—a state of constitution—and this gives us hope that, by treatment, we may arrest its progress.—Read Pott on the Mortification of the Toes and Feet.]

When gangrene has taken place, we hope still that the mortified spots will slough and separate.

[A whole limb may separate, when the hurt is local, and the patient young and of good constitution.]

We look anxiously for a line of separation. This line is the rising of the cuticle, which marks the confines of the dead and living part. On the second or third day we find that ulceration has commenced. We often have to mark this as the period for amputation, as showing a reaction of the system, which promises success if the dead part were removed.]

Treatment.—Think if there be any source of debility in the state of the bowels; clean them out, and follow this with cordials, and all the means of supporting strength.

[Diarrhœa attends, and, if not checked, rapidly wastes the strength. Bark and acid, aromatic confection, camphor, musk, and opium, are the means of supporting the constitution. But manage your resources; have some additional stimulus daily; and on the symptoms becoming worse, apply blisters to the nape of the neck, and fomentation and cataplasm to the stomach.—See Ulcers and Hospital Gangrene.]

To the part apply fomentations, stimulants, and warm dressings.

[A cataplasm of hot port wine is readily obtained in families. Use poppy fomentation (or with cicuta) sprinkled with camphorated spirit. Touch the sloughing edges with tincture of myrrh, or with diluted nitric acid. Lay pledgets of lint, with camphorated oil, in the chasms, and cover all with the carrot poultice, or common poultice with charcoal, or fomenting poultice.]

Anthrax, Carbuncle.

Carbuncle is a peculiar form of mortification, appearing on the trunk, and in men of a certain age who have passed their lives in the full enjoyment of good living.

[It is not a common occurrence in hospital practice, unless in reduced tradesmen, and the decayed butlers and porters of nobility.]

It is a deep-seated, hard, immovable tumour, circumscribed, attended with a sense of burning, and tending to mortification. Dark inflammation marks the spot with pustules like vesications, which breaking, discharge a dark sanies. It is preceded by rigors, depression of spirits, sickness, and sometimes delirium; and previous to these tenderness and fulness of the epigastrium, with a dry cough, and embarrassed respiration. It is often a sequela of typhoid fevers, and is an attendant on plague.

[It is remarkable that it should occur on the body, not in the extremities; but something is learned by this—it is not common debility! As to the parts of the body where it forms, it is over the fascia, or expansion of tendons; for example, over the tendons of the trapezius, between the shoulders; or higher, on the nape of the neck, over the *ligamentum nuchæ*. It is more dangerous when near the head, from the supervening of cerebral symptoms.]

If left alone, there are numerous openings observable, and within the sloughy membrane is visible; but these holes are quite insufficient to discharge the slough.

As this complaint is attended with deep sloughing of the cellular membrane, it requires free and early incisions. You administer a calomel purge, followed with ammonia, bark, and wine; the treatment being that proper to the putrid fever. To the part you apply poppy fomentation, with sal ammoniac or spirits and camphor; the cataplasm of wine or effervescing poultice.

When it terminates favourably, it is by more kindly suppuration and granulation. The cicatrix is irregular, depressed, and puckered, and has long a brownish discoloration.

It is a very dangerous condition, and requires immediate and unremitting attention, lest the patient sink. It is often combined with visceral disease. If with a large carbuncle there is great prostration and syncope, vomiting, delirium, the danger is very great.

Consider the varieties; *e. g.*, *Benign, malignant, pestilential, malignant pustule.*

[Do not mistake, and unnecessarily alarm yourself on the appearance of a bad boil or livid pustule (*furunculus*), which in an aggravated condition is troublesome enough. A boil is a small painful phlegmonous tumour of the skin, of a conical form, the base deep-seated, and on the apex there is a livid pustule. Sometimes it suppurates imperfectly, with a sloughy bottom. It is chronic, advances slowly, and they come out in succession.]

You cannot disperse it if you should. You may attempt to bring it forward by steaming; but you had better cover it with plaster, and attend to the source of them, and to prevent others coming in succession, which you do by attention to the stomach, by an emetic and alterative pill, and by bitter infusion with alkaline solutions. When it looks ill, and exhibits a mass of corrupted cellular membrane, it should be dressed with digestive ointment and poulticed.

As to correcting the disposition to them, after considering the state of the intestinal canal, give antimonials, and order the warm bath.]

Be it also observed that, in the peculiar constitution to which the carbuncle belongs, abscess, as, for example, by the side of the anus and in the perineum, possesses much of the character, and requires all the attention which the true carbuncle does. The affection of the pudendum to which children are subject may be studied under this head.

CHAPTER VII.

OF WOUNDS.

You have now to apply these principles to the cases of wounds, which may be thus distinguished:

Contusions;
 Incised Wound;
 Stab or Deep Wound;
 Penetrating Wound;
 Puncture;
 Laceration;
 Gunshot Wound; and
 Laceration by Gunshot and Shells.

Contusion is an injury by an obtuse heavy body, which neither cuts nor lacerates. But it may burst the superficial vessels, and injure the deeper parts without a breach of skin. Such an injury we are liable to from a fall.

[Accordingly, you attend to the extravasation. The superficial vessels being burst, the force of circulation propels the blood into the cellular membrane, where it coagulates. The appearance is formidable, resembling mortification. *Ecchymosis*, *thrombus*, *sugillatio*, are the terms you hear.

Sugillatio means rather the livid spots of the scorbutic, where the blood is forced into the serous vessels. Consult your medical authors under *purpura hæmorrhagica*.

After a severe contusion, there is a yellowness which extends beyond where there has been direct injury. You see it in a sprain, which proves the discoloration to be an effect of arterial action.

This, again, should be distinguished from the mottled appearance in the dead body.

Ecchymosis is properly the effusion of blood from contusion. The skin is livid or black, and without tenderness.

Thrombus is blood escaping from a vein, as by a careless manner of bleeding. When by change in the position of the arm, the orifice of the vein does not correspond to the orifice in the skin. (See *Phlebotomy*.) A vein may be burst by a fall or blow, and so may an artery. I have known a man, by falling on his buttocks, burst the gluteal artery, and have a tumour of blood extending from the false ribs to the ham !]

The injury in contusion is not to be estimated by the weight or velocity of the instrument, but also by the resistance. Now, as the bone resists, the injury is often deep.

[For example, a smart blow will produce ecchymosis, when the descent of a heavy body will not injure the skin, but the deep parts—the bone or a viscus. Connected with this subject we may refer to the stories of the wind of a ball. Read Sir George Ballingall. But what is that which Mr. Guthrie says, p. 232?]

I have known a blow with a mallet cause deep suppuration in contact with the femur, and under both fasciæ and quadroiceps muscle.

[It is in these cases that the abscess lancet must be carried deep.]

The applications to ecchymosis are camphorated spirit—spirit and vinegar—solutions of muriate of ammonia; leeches will not be of service. I speak of the state of the skin. The inflammation will be in proportion to the injury, and require the antiphlogistic treatment.

The *incised wound* is such a wound as may be given by the sabre, or the scalpel of the surgeon. An open, free, gaping wound, where there is no concealed mischief. It swells freely, and, by proper treatment, unites readily.

Of the bleeding from the general surface we have already treated.

If a muscle, or the fibres of a muscle, be divided, you study the anatomy to give perfect relaxation, or one of two things happen: there is a vacuity left between the cut surface, or the muscle protrudes from the wound.

You use the adhesive strap or dry suture, placing compresses on the side of the wound, and over these the uniting bandage.

[The meaning of these compresses to the sides of the wound is, that the surface deep in the wound may be held together and supported. If this be not done, blood collects there, and afterwards matter. It is for this end that the quilled suture was formerly used.]

Needles and ligatures are to be avoided wherever it is possible.

[If it be said that adhesive strapping irritates the edges of the wound, and therefore the needle is used—the answer is, that your strapping is bad; and it is always possible, by the application of

mild dressing on the edge to prevent all irritation. For this purpose you use the chalk dressing, the *ceratum plumbi cum creta*. The piercing with needles, and the drawing of ligatures, endanger erysipelas, or irritation and swelling of the wound.]

The dressing should be moistened, and the moisture allowed to evaporate.

[Some affect to say that blood is the best dressing—the idea encourages negligence. Bring the edges of the wound very accurately together, and if any thing be required to exclude air, use the Peruvian balsam.]

*The stab or deep wound.*¹—The best idea that can be given of this wound is from the instrument from which it is named, “a bayonet wound.”

[¹ Authors treat this under “puncture,” which is a very different matter. The *stab* is a most important distinction.]

The danger here is of hemorrhage, and of deep inflammation, and consequent swelling and tension under the fasciæ.

[An example may be given in the wound by the small sword, in the sword arm, when the sword goes among the muscles and under the fasciæ. You can conceive that, even if an artery should not be opened, there may be extensive thrombus or extravasation; hence the use of the sucker. See Mr. J. Bell on wounds.]

The wound being cleared of blood, a compress is to be laid in such a manner as to keep the sides together, and with the assistance of the roller the cold spirituous lotion to be applied.

[But here there is a necessity for careful watch being held, lest inflammatory tension of the limb should come on; in which case the bandage will do incalculable harm.]

It is in this wound that we are to expect contraction, from the swelling of the parts under the fascia. In which case, incisions must be made, freeing the fascia as you would a tight bandage.

[There is much said on the inflammation of the fascia; but I apprehend that the cases referred to under this head are inflammations of the cellular membrane under the fascia. See in these cases that you study the connections of the fascia, (for example, that of the fore-arm), and that you make your incisions anatomically correct, and not needlessly.]

You perceive how this wound may be complicated—the blood-vessels opened—the cellular membrane injected—the injury deep and extensive—the swelling of the limb general—the discharge dark coloured, fetid, and confined. This requires all your judgment, or deep abscess and carious bone are the result.]

The *penetrating wound* is a term which designates a very important circumstance: it is where the cavity is touched, the serous lining membrane perforated.

[A boy is climbing over a railing; his knee slips, and the pike runs into his body: then the question is, has it penetrated the peritoneum? If it has, he is in the greatest danger; if not, it is a “flesh wound” only.]

In this wound the attention must be directed to obtain adhesion. If the membrane unites, or if the bowel adheres so as to close the wound, it is from that moment a simple wound, and the danger is past. But if the lips of the wound remain separate, and if, as in that case they must do, inflame and suppurate, then the action is propagated over the whole surface of the cavity, with pain and tumefaction and sympathetic fever.

Every means of subduing inflammation and inflammatory fever must now be employed.

Puncture.—This seemingly trifling wound is sometimes attended with serious consequences. It is as if a small wedge tore aside the fine nervous texture. Hence the pain and nervous derangement from pricks in the fingers and under the nail.

There arises a cellular and lymphatic inflammation, which sometimes terminates fatally.

You fear serious consequences when there is painful throbbing; when there is a red line along the lymphatics of the arm, and pain and swelling in the arm-pit; for there may come fever and oppression of the chest.

[Mere irritation will do this without poison. Thus in the hospital we have the char-woman with a hurt hand, or washerwoman will come with her hand and arm swoln. What is this? "A poisoned hand, sir." But the poison is only the irritation excited by yellow soap. My practice with the youths in the dissecting room has been to touch the point with the lunar caustic, to order a poultice with solution of opium and cerussa acetata, and to hurry them off to the country.]

Punctures about the hand and fingers are attended with that cellular inflammation which, running under the fascia and among the sheaths of tendons, produce indescribable distress. The hand swells up like a boxer's glove, deep suppurations form, requiring to be opened; and when you save the hand, the fingers are too often drawn up and contracted by adhesions between the thecæ and tendons.

[Punctures such as are made by the tongue of a buckle or a dissecting hook, are attended with serious consequences when the person wounded is out of health. Thus our young men become subject to serious consequences from puncture towards the end of a long season, when a confined London life and study in the dissecting room and hospital have produced a peculiar debility.

There is something, however, in putrid matter which makes a distinct case. Be careful not to puncture your finger in opening a body with inflamed intestines; or to put your hand, having a wound or sore upon it, into the abdomen of a woman who has died of puerperal fever.]

Lacerated wounds.—The lacerated wound is characterised by (comparatively speaking) being unattended with hemorrhagy: the fibres torn out are paralysed; the blood-vessels injured, so that coagulation takes place in their open orifices. A lacerated wound

implies also the drawing out and tearing of nerves, and hence the danger of tetanus.

[You will read of the miller in Cheselden's work whose arm was torn off. The occurrence is more frequent now by the extraordinary increase of machinery. A boy was brought into the Middlesex Hospital who in a manufactory had got his arm entangled in a rope, which drew him up, and carried his arm through a hole in the partition; his body fell to the floor, whilst his arm was carried into the other apartment: there was no bleeding, and he survived! Children in manufactories are very frequently dreadfully lacerated, and their hands and arms torn to rags. In old people, in addition to tetanus, we have to dread erysipelas in these wounds.]

It is a wound unfavourable for adhesion.

[But there is no reason why it should not be attempted. I have known the side torn open by a bull's horn heal by the first intention; and so it happens daily.]

The treatment is essentially the same as in the case of incised wounds. But if either tetanus or erysipelas threaten, then tepid anodyne lotions must take place of the balsam dressing and cold application.

We find peculiarity of each of these wounds combined in gunshot wounds; but as the subject of hemorrhage is also embraced in these, we shall first attend to hemorrhage.

CHAPTER VIII.

OF HEMORRHAGE.

[We advance to a very important subject, one which, indeed, is paramount, that requires science for its foundation, and which happily has been remarkably improved by the contributions of British surgeons. Loss of blood is an appalling occurrence for any one to witness; and for a surgeon to see a patient draining of blood, and beyond assistance, is of all situations the most painful.

The student must advance to this department through a laborious course of study;—the structure of an artery, its sheath; the nature of the blood, the powers circulating the blood. He will find his lessons in *Mr. Hunter*, in *Mr. J. Bell*, *Abernethy*, *Scarpa*, *Jones*, and *Hodgson*; and still he will discover that some essential circumstances have been neglected in all of them.

On reading the report on this subject in the year 1816, I find nothing to retract. See my *Quarterly Hospital Reports*.]

The signs of hemorrhage might be considered superfluous, if the loss of blood were always apparent; but it is not so. I have seen patients lost by internal hemorrhage, from the surgeon not knowing the danger in which they were.

[In uterine hemorrhage: in bleeding into the cavities as of the abdomen or thorax; in the draining of blood into a great abscess after they have been opened.]

There is insatiable thirst; he is ashy pale, with lividity about the lips and nostrils; he begins not to see those about him, and a mist is before him, and he is staring wildly; his hands are abroad; he feels suffocating; he grinds his teeth; the pulse is weak and compressible; he *faints*.

[Lay the patient down, that the circulation within the brain may be maintained. I have just lost a friend by the stupidity of those about him. He had fainted many times, and recovered on being laid low; but wanting his usual attendants, they held him up—till he was irrecoverably gone! See hemorrhage by the bursting of the saphena vein].

The quantity which a person may lose and yet retain life, varies with the nature of the hemorrhage. Whilst it drains from a small vessel, the powers circulating readjust the measure to the heart. But a few jets from an artery, as the artery of the groin, prove suddenly fatal; the patient faints, falls back, and if the blood flows, on recovery he expires.

[Whilst the surgeon may take advantage of a faint to proceed with an operation, do not follow the advice of bleeding a patient *ad deliquium*, in order to operate without pain; the practice is dangerous. If the stimulus of the knife does not restore your patient to sensibility and *suffering*, the means you use afterwards may fail!]

All that is most important in this subject is to be drawn from the changes which the artery undergoes; yet is hemorrhage from the veins not to be considered lightly.

[The bursting of a varicose vein in the leg may, if improperly managed, bleed the woman to death. A wound of the external iliac vein is equally fatal with the wound of the artery, being within the valves. Wounds of the veins in the neck prove fatal, by air drawn into them, &c. The inflammation of veins is a very important subject, being very frequently the cause of death in modern surgery.]

Of the resources of Nature in stopping Hemorrhage from an Artery.

What has been omitted by all authors is, the relation which is established between the living coats of the artery and the living blood; that it is the influence of the artery which preserves the blood fluid, and that, deprived of this influence, it coagulates.

Distinguish between venous and arterial bleeding; the difference has sometimes been overlooked, and an operation upon the artery unnecessarily performed! The blood flows uniformly, and is of a dark colour when it proceeds from a vein. It may be stemmed by

pressure below the wound, and it can always be stopped by compression on the wound itself.

Therefore the loss of blood tends to the closing of the orifice by coagulation, *1st*, By the diminished force of circulation; *2d*, By the tendency which the receding powers of life have to cause coagulation.

[It is on this principle, that, in wounds attended with hemorrhage in the cavities of the abdomen and chest, you desire to produce deliquium, that the clot may form in the mouth of the bleeding vessel.]

On the same principle an artery bleeding stops if it be disturbed, but continues pouring out blood if opened without injury to its coats.

[Many years ago I showed that, if an artery was bleeding during an operation, and you took your forceps and pinched it, it would cease bleeding. The intelligent reader will see how this touches on the subject of the *torsion* of arteries, which is nothing more than a mode of injuring the coats. The same principle explains why it is that when a limb is torn off, the person does not die of bleeding, as he would do were it cut off and left so. It shows how a piece of glass will cut an artery with so little injury that the person will die of hemorrhage, when, if the same artery be cut across with a ball, it will not bleed at all. See Wounds of Arteries.]

When we examine the mouth of an artery in which the blood has stopped spontaneously, we find a clot over the mouth of it entangled in the cellular membrane.

[This we see also in operation. If in extirpating the mamma or other tumour, a vessel springs, and the assistant puts his finger upon it, the blood is coagulated, and you see a red spot; and so the artery stops. But remember that, when the patient recovers, and the pulse rises, and the heat is restored, the force of circulation may brush off this clot, and fill the integuments with extravasation. Be it observed, that nothing keeps the blood fluid but the inner surface of its appropriate vessel, artery, or vein; as soon as the blood escapes into the cellular membrane it coagulates; even getting between the coats of the artery it coagulates. See *Aneurism*.]

Thus an artery being wounded bleeds furiously, and *per saltum*; the blood flows more weakly—stops—it breaks out a second and perhaps a third time, and the patient being exhausted, it stops finally; and if opportunity be given, its mouth will be found stopped as above.

[A man of genius values what he has discovered, and respects the thing in others. Dr. Jones was wrought upon to be unjust. His external and internal coagulum were matters better explained by Mr. John Bell, who also showed the danger of trusting to this state of the vessel.]

But this coagulation and the arrest of the blood is aided by circumstances; and, *first*, by *Retraction*.

[If the artery being cut across retracts, it is obvious that, before

the blood can escape from its mouth, it must encounter the elasticity of the artery, and that as much force as is required to stretch the artery is taken from the impulse with which the blood flows from it. Thus if, in bleeding from the temporal artery, you open its side, you obtain blood ; but desiring to stop it you cut it across ! The same reasoning explains why an artery opened by the splitting of a bone bleeds in a formidable manner, although the vessel be of insignificant size : Example, bleeding from drawing a tooth ; bleeding from fracture of the tibia, the nutritious artery of the bone being torn, &c. the contraction being prevented by the cancelli of the bone.]

And, in the *second* place, by *Contraction* ; for when an artery is divided in the living body, the mouth is pursed together in a remarkable manner.

Thus whilst we observe the manner in which the state of the artery *mechanically* tends to the stopping of the hemorrhage, we see the much greater importance on this subject of attending to the condition of life in the vessels, and the influence of it on the coagulation of the blood, and the formation of the clot.

[From the manner in which the labours of Mr. John Bell have been received, his spirit would be well employed in exposing the vanity of writers who yet did not comprehend the very first principles of this great subject.]

In advancing to the next head of inquiry, you study the vascular structure of the artery, the *vasa vasorum* ; for on the action of these the final security against hemorrhage depends.

The injury which the vessel has received excites an inflammatory action on its coats ; they swell with deposit of coagulable lymph, and the inflammatory crust takes place of the coagulated blood. Then only is the vessel securely closed, the artery being obliterated.

[Mr. Travers showed how a hole in an artery being punched, may heal ; but when an artery is opened in a cut (as shown by Mr. J. Bell), it enlarges instead of closing, and the security is the adhesion of the coats, and consequent obliteration of the cavity of the artery.]

Of Styptics, the Cautery, and of Compression.

It is now easy to understand the effects of styptics, that they injure the living coats, and thereby facilitate the coagulation of the blood, and consequent plugging of the mouth of the artery. Whatever hurts the artery will be a styptic.

[A styptic is supposed by Mr. Abernethy (Lectures, p. 206) to act directly on the blood. I must have experience of this before I believe it.

Exposure of the vessel tends to stop the bleeding ; and thus the common air is a styptic. So wine and spirits, mineral acids, alum (in solution or in powder), sulphate of copper, are styptics. See the history of styptics in Mr. John Bell's work.

To use a styptic, dip a dossil of lint in muriated tincture of iron, and apply it directly to the artery, supporting it with the compress and uniting bandage. As they are injurious to the general surface of the wound, they are seldom employed.]

The actual cautery is very seldom used, yet it is held in reserve in desperate cases, and fungous surfaces and deep cavities.

[The effect of the red-hot iron to the coats of the vessel cannot be misunderstood after the preceding sentences. It kills, and by killing, stops the flow of blood. The horror with which it is contemplated is needless and absurd. It is not a painful operation. But there is a better reason against its use in bleeding from *large arteries*, that the slough will, after a time, be thrown off, and the hemorrhage return.]

Compression is a legitimate mode of stopping hemorrhage, but it must be done both scientifically and with mechanical correctness. The compress must be in contact with the artery.

[The *graduated compress* is a succession of compresses of folded lint; one, small, is put down upon the bleeding point, a larger over it, a larger over that, so that the whole has a conical form, the apex downward, and pressing upon the artery. Sometimes a small dry piece of sponge is put down on the orifice of the vessel, the graduated compress over it. Over the lint the double-headed roller is applied; and you take care that the limb is uniformly supported, otherwise there will be œdema of the limb.

Such a mode of compression fails, from the fascia or flat and cellular membrane or coagulum being between the compress and the artery, by which means, although it be effectual by mechanical pressure at first, yet as the vessel is not injured nor inflamed by contact of the foreign body, there is no glueing by coagulable lymph, and when the roller slackens there is bleeding!

Compression may be made effectual—it is a resource—but I do not recommend it.]

Of the Ligature—Use of the Tenaculum or Needle—of the Common Needle.

The ligature is alone to be trusted in bleeding from divided arteries; it is the easiest, the least painful, and the most effectual mode of securing an artery.

The ligature puts a mechanical stop to the hemorrhage; it also stimulates to the reaction of the living vessels, and the adhesion and final obliteration. In this double office it should be considered, to arrive at just principles.

[At the time when writers on surgery ran away with the idea that the action of a ligature was to bring the inner coats of an artery into the state of an “incised wound,” I foresaw what follies would be committed; and as at that time I had a large class of intelligent students, I made the experiment to show that it was the presence of the ligature as a foreign body that excited the coats of

the artery. I placed a circular ligature around the artery, letting it lie in contact with the proper coat of the artery, *without drawing at all*, and showed them the artery stopped by a clot !]

It is not necessary to draw the ligature so as to cut the inner coats of the artery, and it is not safe unless in young and healthy subjects, and in amputations.

[You will observe that the important consideration is the mode in which a ligature should be employed, in old arteries subject to aneurism. It is very dangerous to apply the experience acquired in operating upon the healthy subject to the subject of aneurisms—far less is it safe to draw conclusions from experiments on brutes ! Any mode of securing the artery will do in the young and healthy individual, and in amputation.

I foresaw the effect which would follow Dr. Jones's experiments, that surgeons would be nicking the coats of the artery, by applying a ligature and taking it off again. It did not succeed in the very best hands. Mr. Dalrymple, of Norwich, tried it and failed. Mr. Travers has written some ingenious papers on the temporary ligature in the case of aneurisms. But he has peculiar merit in resigning the use of it.—*See Med. Chir. Trans.* vol. ix. p. 415.

Asalini of Milan, and Dr. Crampton, surgeon-general of Ireland, have, with the same hope of improving the operation of aneurism, simply compressed the artery for a time sufficient to form a clot. I advise you to employ the ligature as I have described it. S. G. Crampton's valuable paper is in the 7th volume of the *Med. Chir. Trans.*

Another folly has been the substitution of catgut for the common thread ligature, under the idea that, being an animal substance, it would dissolve and be absorbed. It does dissolve and get loose, and abscesses form where it lies. See S. G. Crampton's case, *Med. Chir. Trans.* vol. xvi.]

Use a ligature of two or of four threads, according to the size of the artery ; take care that, in preparing it, the threads are laid parallel, and waxed and oiled before it is applied ; tie with a simple knot, and tie it again. Be sure, where the case is of importance, that the ligature is in contact with the coats of the artery, that neither fascia, fat, nor even the sheath intervene. Do not cut off the ends of the ligature, but twist them together into the smallest compass, and lay them down on the side of the wound ; and if there be many ligatures, arrange them, and mark the one that is on the principal artery by knotting it.

[The common error in applying the ligature is including a portion of cellular membrane and sheath. The consequence is, first that the vessel is protected from the contact of the ligature, consequently it does not inflame ; and, secondly, the substance included in the ligature wasting, the mouth of it is open !

Mr. Lawrence, in the *Med. Chir. Trans.*, vol. vi. p. 156, treats of some important subjects, but the chief part of the communication is on the *ligature of arteries*. He is the advocate for small hard

single thread ligatures, which he cuts off short by the knot. This was a practice of John Bell's, and which I did not approve of then, nor do I now. The object is to procure immediate adhesion, which, it is alleged, is prevented by the common manner of retaining the ends of ligatures. I have seen patients under the hands of good surgeons, shrieking and complaining of their toes, when ligatures were put on the arteries on the face of the stump. In matter of fact, the ligature often includes the nerve. Conceive, then, the misfortune of having a fine hard thread firmly tied on a nerve, and the ends cut off—conceive the distress, the pain, the tic, thence arising! and you will not follow this fashion—for it is but a fashion. Long after the stump should have been well, ulcerations have been occasioned by the ligatures being cut short, and the noose left.]

Some writers on surgery do not seem to know the practical advantages of a tolerably thick ligature, both ends being permitted to remain. When the time arrives in which these ligatures are to be taken away, nothing is more easy: the ends are twisted, the noose tightened. If the ligature does not come away, fasten the ends thus twisted up the side of the wound, and on the next dressing a further twist brings them away.¹ If this be not done, the surgeon is obliged to tug directly on the end of the vessel, and he may disturb the coagulum. The same consequence results when the surgeon cuts away one of the ends of the ligature, for then what remains cannot be twisted.

[¹ Just before I left London this occurred to an hospital surgeon. On going his round he began to be ashamed of the state of a stump, kept open by a ligature hanging from it. He, resolving that this should no longer offend him, took hold of the cord and violently pulled it away, when there came a jet of blood full from the femoral artery!

If the ligature be not twisted, and if the threads lie loose, which they are apt to do, they get entangled in the granulations.]

Use of the Needle and Ligature.

However the discovery, as it is called, of the needle has been lauded, it is a very awkward and imperfect operation. The needle being threaded with a triple waxed thread, the point is made to enter deep by one side of the bleeding orifice. It is brought out and again entered at the point at which it came out, so as to make another dive, and come again out on the side opposite to where it first pierced; the needle being cut off, the two ends of the thread are tied and drawn. You at once perceive the imperfection of the operation, and that it possesses every disadvantage; that it embraces too much, probably the artery, vein, and nerve, and sheath, and at all events a quantity of cellular substance must be included; and that, therefore, it is insecure by the wasting of the included substance.

In using *the tenaculum*,¹ you pick up the orifice, trying rather

to transfix it with the point when your assistant throws round the ligature and ties it. The Asalini forceps is an excellent substitute for the tenaculum when you have no assistant. You seize the orifice and let the instrument hang, and place round the ligature with your own hands.²

[¹ Mr. Samuel Cooper is justly severe on a bad drawing of mine, which represents the tenaculum and ligature. I could have wished many observations of his had been as well founded, it would have saved some of us a deal of trouble.

² Some young men perform this office very awkwardly, and pull off the ligature. You ought to take the ends of the ligatures in your hands, and force them down into the cavity of the wound with the ends of the forefingers. The ligatures are then, by a motion of the hands, drawn over the ends of the forefingers as over pulleys. If you do not contrive this, the knot being in the depths of the wound, and you pulling outwardly, you necessarily pull the knot off the vessel.]

When there is a small bleeding orifice, as from a callous ulcer, or from the glans penis in a state of ulceration, you may use the common housewife needle in this manner. There is no thread in the needle; you mark the bleeding point, and passing the needle in at one side you bring it out at the other. It is of little consequence whether you transfix the bleeding vessel or not, for on throwing a ligature over the needle and tying it, you draw tight the surrounding substance; next morning you withdraw the needle, and let the ligature remain; it falls off in time.

Of Secondary Hemorrhage.

Secondary hemorrhage is when, after the surgeon has performed his operation, the blood bursts out again. It should perhaps be confined to hemorrhage from the bursting of the coats of the artery upon the ligature, a subject of paramount importance. It has two causes—1. The ulceration of the coats where the ligature presses; and, 2. By sloughing of the artery where the clot has become loose, or has not extended far into the artery.

[The ulceration of the artery may take place from the high irritability of the subject, and the forcible pulsation of the artery against the ligature. Hence the importance of health in all operations on the arteries. Thus I find in my notes, “uneasy, no sleep, irritable countenance, dead feeling in the limb, dry tongue, breathing hurried, abdomen tender; on the seventh the artery burst.” The sloughing takes place from dissecting the artery too much from the surrounding cellular substance and sheath, consequently cutting off the *vasa vasorum*, leaving the vessel dead. Secondary hemorrhage is also induced from the imperfect formation of the clot, and that from tying the artery at a part too near the going off of a branch.]

A double ligature has been employed; when the surgeon feared

the security of the first ligature, he has placed another above it, either loose to draw if required, or drawn to a degree so as to take the force of the circulation from the principal ligature; all which is bad practice.

[In reviewing this matter of the ligature of arteries, I fear I do not express an opinion agreeable to some of my esteemed friends, when I say I have learned nothing by their ingenious inventions, since I left Edinburgh in the year 1806; and this I attribute to the neglect of that principle, drawn from the consideration of the mutual influence of the vessel and the blood—that *the injury of the coats of the vessel is attended with the coagulation of the blood*. Ignorance of this principle led to the idea of Dr. Jones, that it was necessary to cut the vessel with the ligature—that to the employment of small ligatures of the thread used by the dentist—that, again, to the cutting of the ends of the thread, and leaving the knot in the wound to be buried in the adhesions. Then came the practice of using silk, and then of catgut, or strips of leather, under the idea that the material being of an animal nature it would be absorbed! To which, we may add the ligatures of lead and of gold, under a new fancy, *that they irritated less!!!* If to these we join the practice of Scarpa, which was intended to bring the sides of the artery together without cutting them, by means of six threads waxed flat like a tape, having in its embrace a rouleau of lint along with the artery, we must conclude that, with all this praiseworthy activity, there was displayed a want of just principles.

The conviction that my brother's conversation and practice left upon me was, that the artery should be firmly tied with a moderate sized ligature—that the surrounding parts should be disturbed in the least possible degree, and care taken that, whilst the thread was within the sheath, and in contact with the proper coats of the artery, the *vasa vasorum* were to be preserved entire. After all these inventions, the sarcastic remark of Mr. John Bell is applicable, when he rejected the *ligature d'attente*, and all other mechanical precautions—and the *rule* stands just where it was.

If surgeons had attended to the fact, as I originally announced it, that the blood would coagulate in an artery which was hurt “by a twitch with the forceps,” we should not be in admiration of the “torsion” and “froissement” of the artery by M. Thiery, nor the “acupuncture” of M. Delpeau.]

I shall say little here of the *tourniquet*. It was an important improvement, and continues to be a most useful instrument.

[Read Sir Stephen Hamnick on Amputations, p. 49.]

When Sir Astley Cooper embraced the thigh with his powerful hands, to show that amputation might be performed without it, and that if it failed you had the resource of compression, he did not mean to give sanction to the vanity of not using it on proper occasions. If you have stopped a bleeding by the tourniquet, consider that you have stopped also the circulation in the whole limb; and ask yourself how long an extremity may be left without circula-

tion? and especially remember, that it is a state of suffering so great, that the wounded man will loosen it, encountering death rather than suffer the pain. For this reason the compress and roller is generally better security against bleeding in recent wounds. See Amputation, Aneurism in the Arm, &c. I have known the tourniquet, improperly used, crush and open the femoral artery. For occasional use, he does not deserve the name of surgeon who cannot make a tourniquet out of a saddle flap and girth.

See Wounded Arteries and Aneurism.]

It is always possible to command the main artery of a limb by pressure. Indeed a slight pressure is sufficient, if it be direct on the artery.

[Mr. John Bell has said, it is one thing to suppress the pulse in the lower part of the limb, and another thing to stop the course of blood. He never made a more important observation. I was present at an amputation at the shoulder-joint, when the assistant compressed the artery above the clavicle. The surgeon felt the wrist, and there was no pulse, and set to his operation. When the artery was cut across, the blood flowed out *pleno rivo*!

I should be very cautious in criticising Mr. Guthrie—one possessed of so many excellent qualities as a man and a surgeon. But when the worthy baronet Sir James MacGrigor recommended Mr. Guthrie to attend my lectures, he might have heard an explanation of this aphorism of my brother, which might have saved the criticism in page 165, on gunshot wounds.

Although no man has done more to confirm our notions of the free inosculation of arteries than Mr. John Bell, yet he was mistaken on one memorable occasion. In a case of operation* on aneurism in the thigh, the blood having sprung, he undertook to suppress the bleeding; but although he pressed his thumbs with all his power on the inguinal artery, the blood continued to flow! On which the late Professor Russell got above him to add weight to his energies, but both together could not command the bleeding. Now this was the reason of his opinion so strongly expressed—and the rule is a good rule; but, for a reason which in after life I had abundant proof of, the blood did not pass by the artery which these gentlemen compressed, but by the collateral circulation: and so remember it will, unless, whilst you press the main vessel, you grasp round the limb.]

Of Wounded Arteries.

[Look to my Surgical Observations, Report on the Ligature of Arteries.]

In addition to the principles laid down under the head of *hemorrhage*, a few rules on the operation on arteries *accidentally wounded* may enable us to conclude the subject.

Before we can say that an artery of a certain size requires a liga-

ture, we must take into the estimate how it has been opened, and by what instrument.

A girl cleaning a window puts her hand through the glass and cuts her wrist, wounding the radial artery; she will bleed to death by successive hemorrhages from such a wound.

A gunshot through the wrist or hand does not require a ligature.

[There are extreme cases, illustrative of a principle already laid down, that the injury to the coats deprives the blood of that which alone keeps it fluid. A surgeon having thought proper to amputate the fore-arm for a gunshot fracture of the further end of the ulna; I examined the artery, and on introducing my probe found it stopped for the length of an inch and a half. (Case of Mackenzie.)

A ball shattered the angle of the jaw, passed obliquely through the tongue, came out by the edge of the mastoid muscle; the nerve of the tongue was cut. The wound bled for half an hour, and then stopped.

A sword passed in this direction would have required the ligature of the carotid.

As a knife or lancet, or piece of glass, will make a wound of the radial, ulnar or tibial artery, that demands the operation of a ligature, how is it in the case of a splinter wound? It will depend on the character of the wound; *i. e.*, the force with which the splinter is driven, &c. (Case of Neil.) Read on gunshot wounds.]

An attempt was made some years ago to render the cutting down on an artery an easy and certain operation, by lines drawn with mathematical precision on the exterior of the body. It is dangerous, and will lead the operator into confusion and difficulty; trust to nothing but an accurate knowledge of anatomy.

Do not suppose that the limb is in the condition of the dissected body, or even of the natural and living frame; for very often it happens that, from the inflammation attending the wound, and possibly from the attempt at suppressing the hemorrhage, the limb is unusually swollen. If you have to cut down upon the artery, you are surprised at the depth of cellular substance.

[Thus I have seen a surgeon begin to cut for a ball, or to lay bare an artery; but not having calculated on the depth of firm œdema, he has been puzzled, and resigned the scalpel to another.]

Another thing to be considered is, the gorging of the limb with extravasation.

[Often it happens that, in a wound with profuse bleeding, the attendant, or even a timid surgeon, closes up the wound, and applies a dressing sufficient to prevent the outward flow of blood; but the limb is injected with it.]

When a limb is thus gorged, and you are cutting down upon the artery, the general form is no direction; but the point of bone stands you good, the clear tendon will appear among the bloody cellular membrane: and this is the meaning of the recommenda-

tion I gave you in the introduction, to study the direction of the tendons in reference to the position of the artery.

Wounds of the arteries in the palm of the hand, and by the outside of the thumb, are very troublesome.

[You may close the wound, put on a compress, make the patient grasp a body like a hand-ball, and roll the hand in this position. But if the compression be imperfect, then not only the bleeding returns, but the hand is swollen with inflammation and with extravasated blood.]

When the hemorrhage returns in a swollen condition of the hand, it is often impossible to pick up the bleeding orifice, and indeed the blood flows from several points; and you are forced to tie the ulnar or radial arteries at the wrist.

[There are abundant cases recorded of disaster proceeding from bad surgery in wounds of the hand; and the surgeon, after bungling in attempts to secure the artery, has finished the series of errors by amputation.]

The inosculation of the exterior of the hand and of the foot are so free, that, when you have tied the artery, in half an hour the bleeding recurs by the circle of inosculation; therefore you will have to compress in the course of the inosculating vessels.

[In these cases you contrive to compress in the course of the artery, leaving the circulation in the hand or foot free. For example, in the foot, when the anterior tibial artery is bleeding, as it goes forward on the foot, you place a fragment of splinter across the sole, and another across the instep, over the compress, the sticks being tied together, you twist the cords so as to press down the upper stick upon the artery, and to any degree you choose.]

The radial and ulnar arteries should be secured above and below the division. I have seen the blood coming from the lower mouth. I am surprised that Sir George Ballingall should, for these accidents, have tied the humeral artery! We must place against him the case narrated by Mr. Abernethy, where, after tying the brachial artery, the hemorrhage returned from the lower end of the ulnar. (Lectures, p. 203.)

["A gentleman was wounded in the fore-arm by a pistol shot. The arm swelled prodigiously; abscesses formed in the fore-arm; and it was thought necessary to open them freely, and to rip up the fascia: in doing this, unfortunately, the radial artery was touched. The bleeding was profuse; and from the weakness of the patient, critical: my reader may conceive from what has been described, that nothing would be so easy as to compress this artery; but let him consider things as he will find them in practice. The man's arm is swoln to half the size of the body; great abscesses are in it; it is inflamed, and so painful, that a heavy foot in the room, or the lifting of the thumb of the patient, gives excruciating pain. It is evident that the wound cannot be effectually stuffed and compressed when in this state. I know not on what grounds the surgeon determined in the preceding instance, but he took up the humeral

artery, and not the radial artery. Still the bleeding continued. This put my notions of the effect of ligature into strange perplexity. Still the patient bled, and what could be further done?—and in a short time he died. On dissection, I found the radial nerve with a firm ligature around it, but the humeral artery was not included. I never had seen the radial nerve mistaken for the humeral artery, but this was the third time I had found the radial nerve with a ligature around it.

“This is a pure case of a division of the radial artery, by the knife, proving fatal; and these cases leave no room for conjecture on the difference between gunshot wounds, those by splinters, and the clean cut of a knife. It is in this latter case especially that we have to cut down upon the artery and take it up.”]

In wounds of the arteries, (and of the arm more especially,) you must learn the position of the member when the wound was inflicted. For example, when a man is aimed at, he is in a position of resistance or defence; so that the assassin's knife strikes obliquely through among the muscles; and in such a case, when the attempt was made to secure the artery, I have seen a great confusion and difficulty.

[It is owing to this that sometimes it happens, that, although the artery be struck, it does not bleed, even when an incision is made to lay it bare! Because the muscles in their new position—*i. e.* the position different from what they were in when the blow was struck—have closed upon the wound in the artery.]

When the wound is made, we shall suppose, obliquely from without, and the instrument has not passed through the arm, it is proposed to enlarge the wound. The thing is impossible. All you can do is to introduce the ball-probe in the track of the wound, and cut upon it, and enlarge that counter opening so as to show the artery.

[The whole case narrated in my Surgical Reports—a wound of the humeral artery—p. 271, may be read with advantage.]

If the artery does not bleed when thus exposed, compress it below—*i. e.* farther from the heart; it will then give out its blood.

In passing the blunt needle round an artery, be careful to be within the sheath, and also to bend the arm, so that the artery may be easily distinguished from the nerve and vein.

[By neglecting this, I have seen the radial nerve included with the humeral artery at the bend of the arm. On another occasion, I found the ligature hanging from the axilla around the ulnar nerve. Death followed in the first instance; great distress and contraction of the arm in the second.]

Tie the wounded artery above and below the wound.

[The rule is absolute, as the lawyers say. But how slowly have we come to this conclusion! The cases are numerous which exhibit the disastrous consequences of this neglect. I had a conversation with Mr. Abernethy in 1826 on this question. You find

the rule in his Lectures, p. 203, with a case of wound of the ulnar artery.]

When you have done your duty in securing the artery of a limb, lay it out free from all compress and roller, and above the level of the body; use light dressing, and keep it moist with spirits and water.

[Read a case in Mr. Abernethy's Lecture, p. 206. I have seen a very small artery on the back of the hand, opened in using the lancet to an abscess, bleed profusely and repeatedly, a hemorrhagic action having been induced. It is to prevent this that the antiphlogistic practice must be employed.]

The success of an operation upon the main artery of a limb will be in proportion to the lesser degree of tumefaction and œdema induced. Much dissection and too free fingering, by bringing on inflammation and tumefaction, will diminish the free action of the collateral arteries, and cause mortification. See Aneurism.

CHAPTER IX.

OF GUNSHOT WOUNDS.¹

The peculiarity of gunshot wounds lies in the velocity of the projectile; and it must be immediately apparent, that there is something at present which gives the subject importance, even in a period of peace. The extent to which machinery is carried—the

¹ I wish my reader to understand, that, on this subject, I have some title to have an opinion, having sacrificed much to obtain ocular demonstration of facts. Even before the battle of Waterloo, I had ascertained what were the prevailing rules of practice both in the army and navy; nor had I failed of my duty to object to some of them. When among the wounded at Brussels, June, 1815, being very busy, Mr. Hennen importuned me to go to his apartment. In this he did a good-natured thing, for it was with the obvious purpose of showing me a thin volume, in conspicuous position, which he said was his manual, and by which he had arranged his wounded! This was my *Appendix*.

I could (distinguishing the discipline, economy and health of armies, from purely military surgery) affirm, with truth and justice, the possibility of treating this subject from my own cases and observation, and without reference to an author of the last twenty-five years. But I shall have more regard for my reader than to vindicate myself at his expense.

You will find the old authors on army practice pointed to in Mr. John Bell's works, and with suitable comments—Paré, Belloste, Ravaton, Le Dran. When we seek for principles, we must again turn once more to Mr. Hunter, and then to Baron Percy, Baron Larrey, Mr. Copeland Hutchison, Mr. Guthrie, Dr. Hennen, and my colleague Sir George Ballingall, who, exercising his own good sense and experience, pays sufficient regard to these authorities, and may be said to embrace all their doctrines.

length of railroads—the incalculable rapidity of motion of the beams and wheels,—give occasion to accidents where the wound partakes of the character of those which are inflicted by splinters from ship-timbers, from palisades, or stone ramparts or bomb-shells. Now, at least, it will be acknowledged that there is some resemblance between the duties of the military and the domestic surgeon!

Let us attend to the wound by musket shot.

An obtuse missile driven through the body with immeasurable velocity.

[Immeasurable? This subject has been taken up quite philosophically and pleasantly: a cannon ball moves 2000 feet in a second; a 32-pound shot will pass through the bodies of seventy men; considered as sand bags, and placed like nine-pins; an ounce ball will pierce through the bodies of four men, being projected with a velocity of 1700 feet in a second. D'Antoni of the Acad. of Turin. Dr. Hutton on the force of gunpowder, Philos. Transac.]

Some estimate being made of the velocity of a ball, we have to consider the effect of the passing of this projectile through the body,—that it leaves a kind of conduit or pipe, the sides of which are dead by the attrition or friction of the passing body.

Let us consider this more particularly; and for this purpose lay a shilling on the paper and run your pen round it—make another circle exterior to the first, and a third exterior to the second. Now, the substance in the area of the inner circle must be displaced, and with the velocity aforesaid! It must be propelled into the space between the inner and second circle, and all this is dead by attrition. But in what state is the portion between the middle and outer circle—bruised, benumbed, but not dead; it reacts slowly, and inflammation is set up.

[When you look at a gunshot hole, it is black and sloughy, with a circle of livid colour round it, which is in exact correspondence with what is here stated. The condition of the parts in the outer circle pervades the whole tube of the wound.]

Hence there is little or no bleeding. There can be no union in the wound; it must slough; the inflammation comes on slowly; and as the action penetrates the limb, the swelling must be general and great.

[In the early stage the wound is small, the counter opening large. In the after stage, the counter wound is contracted, and the place where the ball entered is widened by ulceration. This is applicable on the same principle, that where the attrition is greatest the wound is slowest in the ulcerative process.]

You can introduce your finger into a shot hole, even into that made by a French musket, which is smaller in the bore than a British musket. And that you can do this, you will find to be an important circumstance in the study of gunshot fracture.—See Compound Fracture.]

These facts give rise to some reflections. A ball at rest does no harm, or very little, unless it interfere with the motion of a part. It

is not to be cut out at the expense of deep and large incisions. It is so little poisonous that a sac will form round it, and it will remain stationary for years.

[A ball being deep seated, (for example, about the loins,) remains with little inconvenience to the patient; but a ball under the skin causes immediate inflammation, and, if not cut out, will soon make its way by suppuration and abscess.]

Since the *character* of gunshot wounds arises from the velocity of the ball, it must have less of that character the deeper it goes; and if it makes its exit, the counter opening will have less slough, and be more inclined to heal.

Again, as the *character* depends on two circumstances, the obtuseness of the body, as well as its velocity, it will happen that, when a ball is flattened against a bone, and then cuts its way out, the counter opening may heal by the first intention.

In a few days a gunshot wound begins to weep, and then the sloughy cellular membrane protrudes from it; but, for the reasons stated, it exhibits the largest portion of slough where the ball has entered.

[This slough chokes up the wound and confines the matter.

We may sometimes ascertain that a ball has passed superficially, from the quantity of slough that hangs from the orifice.

If a ball has passed plump into a cavity, (for example, the abdomen,) there will be little slough; but if it has taken a course round under the skin, the quantity of cellular membrane deadened will occasion a large protrusion of slough. (The sketches in the Museum of the College of Surgeons were taken from patients to illustrate this.)

We shall sometimes discover the course which a ball has taken from the blush, a streak of redness in the integuments over the track of the ball.

By these views we learn the *rationale* of some rules of practice. It was supposed, from the blackness around the orifice of the wound, and from the serious consequences of gunshot, that the ball was poisoned, or that the lead had a poisonous quality.

[Hence arose the practice of scarifying gunshot wounds. But the necessity of opening the wound freely in modern surgery ought not to be confounded with the ignorant scarification of the wound.]

A musket-ball making a muscular wound, as across the shoulder, or hip, or back of the thigh, or of the arm, requires neither scarifying nor opening with the bistoury.

[Simple treatment, and the application of a cataplasm, is all that is necessary.]

But a wound from a ball taking a course under the fascia, where it is strong and unyielding, becomes complicated; the whole limb swelling in the course of the wound distends the fascia, and thus the natural binding of the limb is as hurtful as if the surgeon had applied a tight roller to an inflamed limb. The fascia must be largely opened.

Let us now consider the effect of a ball which has struck a bone. It is possible that the lead is no longer of the round form; it may be flattened.

[It sometimes is so flattened as exactly to resemble half a musket or pistol-ball; and from this circumstance duellists have been accused of cutting their ball in two!]

On striking the skull obliquely, it is quite flattened, and then runs under the scalp extensively, of which I have many examples in my Case-book.]

When a ball has shattered a bone and passed through, it is no longer a ball, but an irregular piece of lead.

[I have picked out balls thus cast into irregular and fantastic figures by breaking a bone. You perceive how the practitioner may be deceived in thinking to extract a ball, when it has become a flat or irregular shaped piece of lead. (Case of the French privateersman.)]

The ball, however, keeps its form while it retains its velocity. It will pass through the hardest bone without losing its globular form. It is by being weakened or retarded in its course that it takes an irregular shape.

A ball may be lodged deep in a bone.

[The example in General D——'s case, College of Surgeons.]

But it more generally passes the firm bone, and is lodged under the ligament and periosteum beyond.

[Just in the manner that a ball will pass through the body or the thigh and be found in the pantaloons; or passing through the muscular substance, it will be found just under the skin in the opposite point.]

From the form and velocity of the ball, oblique resistance has a singular effect in sending it in an unexpected direction, and often making it circle round the body, when you would have thought it must have penetrated the cavity.

[In striking the rib, or even the fascia of the abdominal muscle, it is sent off to the integument obliquely; the elastic integument repels it with an increased obliquity of direction, and it takes a course in the cellular substance; so as sometimes to make the half circle of the body, and rest at a point opposite to where it entered.]

So will a ball make most unexpected range about the shoulder or pelvis.

[An old patient came into my room, and putting my hand on the left side of his belly,—what is that? says he, thinking to puzzle me. It was a pistol-ball, which lay in the sheath of the rectus, and all inflammation having subsided, it was as distinct as if it lay in his waistcoat pocket. He had returned from the West Indies, and boasted of having hit his antagonist in the forehead, which, he added, by miscalculation of its hardness, did him no harm! These were two desperate duellists, and both instances are illustrative; in one, the ball striking above the ileum of the right side, had got within the external oblique, and so round into the sheath of the rectus; in

the other, it had been flattened on the os frontis, and run under the integument.]

A ball will not only run far between the skull and integument, but between the skull and dura mater.

[I found a soldier with a shot in the forehead. I passed a bougie in its course under the os frontis; trepanned, and took it out a hand-breadth from where it entered, and the man recovered.]

It does not always happen thus. I was called to a gentleman who had put a pistol to his temple. He sat up in bed chattering continually, a frightful figure, the integuments of his head swollen so as to close his eyes, and of every colour from lake to black. I found brain upon the pillow! On putting my finger into the shot hole, I felt it round and jagged. Concluding that, since the ball had pierced the skull, and dura mater, it would meet with no resistance until it traversed to the opposite side, I cut down on the opposite temple, and finding there the bone beat up, I trepanned, and took out the ball. I need not say this person was mad. When inflammation was set up he became comatose, and died on the third day.]

A musket-ball may enter a cavity and course round the interior, a circumstance which is explicable on the same principle.

[An instance is mentioned by Sir George Ballingall, in which the ball entered the thorax, and stuck in the inner surface of the sternum. *Outline of Lectures*, p. 228.]

A ball will sometimes seem to drop into the cavity of the thorax. I attended a colonel of the Russian service, where the ball appeared to roll about! (I recommended perfect rest whilst the ball was in a gravitating position, in the hope that it would be covered with lymph, and fix.) So have I found a ball lying in the bladder.]

In cutting for a ball, consider its course as the man stood in receiving the shot, which will very probably give you a more correct estimate of its relation to the artery and nerves.

[I remember standing by a very excellent physician (a man of great merit and enthusiasm in his profession, but not educated to anatomy in the manner I have recommended in the Introduction). He cut down upon a ball which lay on the inside of the arm. Now I had taken the man's case, and studied the position of the ball. This man received the shot whilst stooping forwards firing his musket. The ball entered and crossed the wrist of the left side, entered again on the forepart of the arm, and passing through the biceps, it was flattened against the humerus, and so had got under the brachial artery and radial nerve. Wherefore, as the doctor cut deep, and began to be uneasy at the depth, I said to him, You are cutting directly on the main artery: on which he good-naturedly said, "I believe you know best;" and put the knife into my hand. I enlarged the incision, and drew a mass of ragged lead from under the artery and nerve, in the direction in which it had entered.]

The nerves will sometimes indicate the course or position of a ball.

[I might have said in the last case, that by the numbness in the

course of the radial nerve, on pressing against the ball, I had informed myself, that although it lay apparently superficially, the nerve ran over it. So when a ball has taken its course through the pelvis, or across the shoulder, the defect of feeling in the extremity, being studied anatomically, will inform you of its course; that it has cut, or is pressing on a certain trunk of the nerve.

In a bad gunshot wound, when there is doubt about the propriety of amputation, if the nerve be cut across it may be considered as determining the case, since even when such limbs are saved they are useless. I have been requested to take off the arm years after such a wound, from its being a mere incumbrance.]

The period of danger from bleeding is when the weeping secretion begins to push off the slough: and when the ball has been impelled upon a great artery, our anxiety must be great, lest fatal hemorrhage should occur; yet, on the other hand, it is surprising what escapes the artery makes.

[I have seen the wound imply that the femoral artery must be divided, and yet nothing occurred to countenance the belief. Sir George Scott received a grape-shot, which passed under the clavicle, and in a direction which, had it been a sword-thrust, must have cut across the subclavian artery; yet all was safe.

The elasticity of the coats of the artery, and the toughness of the sheath, is, I must presume, the cause of the great vessels escaping; they yield to the impulse.]

It would appear that a ball passing across the trunk of an artery, causes so much injury that the blood coagulates, and there is no immediate fatal hemorrhage. Understand me that this *may* happen; but in general the artery so cut across is *attended with immediate and fatal hemorrhage*.

But it would appear (and here I trust to Mr. Guthrie's narrative), that the great artery of a limb may be divided, and the gangrene shew itself on the *third day*.

[One may reason on such an occurrence in this manner: the ball passing across the artery or so near as effectually to injure it, stops the circulation in that vessel; but there is nothing in *this stage* of a gunshot wound to injure the circulation in the collateral vessels; therefore the circulation goes on: But when the limb becomes tumid, from the deep extensive inflammation attending the living second stage of gunshot wound, then mortification shows itself, commencing in the lower part of the limb.]

When, therefore, mortification takes place consequent on a wound, in which you trace the ball to have gone against the main artery, amputation is the only resource, and it should be done early.

[You will distinguish the mortification consequent on defect of circulation, from that which comes from a constitutional cause. Still the contact of the dead and living part cannot long exist in this traumatic gangrene, without communicating a taint to the constitutional powers; which is the reason that you cannot wait after the case is declared,

This subject may be considered as continued under *Compound and Gunshot Fractures.*]

Splinters and the fragments of shells tear the flesh; and they have more or less of the characters of lacerated wound or of the gunshot wound, according to their velocity. Their sharpness may open the flesh with very little contusion or attrition, and there will be the natural attendant hemorrhage; in which case, after securing the bleeding orifice, the flesh may be put down as in amputation.

Langrage shot (understanding by this those broken masses of iron which are sometimes used), as well as splinters, stick so between the bones, and have been driven with such force, that the whole limb receives the shock, and mortification follows.

Cannon-balls or round shot, as they are termed, take life by the concussion. And more or less of this general injury upon the nervous system attends the destruction of limbs, as well as when the injury is near the head or on the body. The momentum of the shot will be given to the part which stops its course, and the more in proportion to the opposition. Thus the thigh being carried off is mortal, when the arm being so shot away the man survives.

[I have made seven sketches of men without arms from among those which I took from the field of Waterloo, but I never saw a living man with his thigh carried off.]

There has been much waste of words on the subject of the *windage* of a ball. The effect is to be attributed to the oblique direction of a spent shot.

[I have seen the flesh of the pectoralis muscle torn quite away. What, then, should have been the state of the parts beneath, on the suppositions of those who maintain the opinion, that the air is so compressed by the ball as to become capable of bruising the integument, or breaking a bone? What, again, would be the state of the chest in those cases in which the arm is taken off by the shoulder?]

When a limb is carried off by round shot, it leaves the remaining part in a mangled state. From the principles on which we have proceeded so far, it will be manifest that the integuments, by yielding, may escape, while the bone is shattered. So at least it happens, that the loose skin overhangs the muscles and the shattered bone when the arm is carried away; and so also it happens that the bone is shattered above where the muscles are divided.

If this wound be left, it goes through a painful process of sloughing and suppuration, during which the patient sinks to an extreme degree of feebleness and nervousness. Some seven or eight days after the affair, you find the flaps of skin swollen in irregular masses; and though they may then be brought together by proper dressing, yet if assistance should be at hand during or after the engagement, it is better to save the patient from this condition by making a regular amputation.

But there arises another question—is not this regular amputation too much of a shock, when the unfortunate patient is reduced by

the wound and loss of blood? and no doubt it is: which has inclined me, in the case of lacerated wounds by machinery, to carve out a stump from the lacerated integuments, rather than perform the operation of amputation regularly.

Of Commotion from Severe Wounds.

That severe wounds, and consequently severe gunshot wounds, are attended with nervous depression in an extraordinary degree, there can be no doubt. We must not be persuaded out of our senses. I cannot do better than quote from my friend Mr. Travers.

["A fine lad received the charge of a musket, consisting of slugs, in the thigh. The femur was shattered; there was no external hemorrhage, but the pulse could not be felt at the wrist. His countenance was pallid; the surface cold, the pupils dilated. He was rational when roused, but strongly disposed to stupor. He made no complaint of pain, but only of insatiable thirst. Cordials were given, and hot cloths applied to the pit of his stomach. He died, with only an increase of stupor, at the expiration of nine hours.—*Travers*, vol. i. p. 111.

A young family was sitting round a mortar, preparing fulminating powder. It was their father's business to make this powder. It exploded, and one was killed on the spot—another was brought into the hospital and died—a third had his leg amputated. These lads were in the condition above described. Here, probably, the shock was general to the body; but I have seen the same condition of mind and bodily frame from the legs being crushed.

Sir Astley Cooper gives similar testimony of a man whose knee was crushed; the patient pale, cold, and pulseless, but without loss of consciousness, died comatose, and within a few hours of his admission into the hospital.

There can be no doubt of this fact; and upon this the question arises—what is the period for amputation?

See, in continuation, Wounds of the Head—of the Thorax—of the Belly. See Compound and Gunshot Fracture.]

In surveying this department, we must acknowledge its importance and extent. We see that there is a peculiarity, but no mystery, in the wounds by gunshot. The fracture requires a knowledge of principles, and a perfect acquaintance with anatomy. When balls are to be extracted—when let alone—when amputation is to be performed—and whether on the field or after delay; these are most difficult questions; but they are, after all, questions which, if the surgeon cannot determine, he is as unfit for domestic practice as for the field or the cockpit.

CHAPTER X.

OF TETANUS.¹

One of the most alarming consequences of wounds is tetanus. This consists of violent and permanent contractions of the voluntary muscles, and consequent tension and rigidity.

[*Trismus* or locked-jaw is a lesser degree of the affection. *Opisthotonus* is the utmost violence of the disease, when the body is bent back, to such an extent sometimes, that he rolls insensible, resting on the head and heels. Other distinctions are drawn from the class of muscles brought into action. The subject is necessarily divided into *traumatic, acute, chronic, or mild.*]

What produces these terrible symptoms we hardly know. In the West Indies, and in warm climates, it is produced in an idiopathic form from exposure to the night air, especially during sleep; and most probably by exhalations from the ground. Further, we know nothing of the nature of this complaint.

[It will arise from lacerated wounds, and the exposure of tendinous parts; it will be produced by bruised nerves; but it will also be produced by a slight abrasion of the skin, or a puncture. It will come on at the period of the cicatrisation, rather than in the violence of inflammation. A kindly suppurating wound is least allied to it; and such a condition of the wound we often desire as most likely to put a stop to its violence.]

As the cases have presented themselves to me, my attention has not been called to premonitory symptoms, though such might have been observed: dejection, and an anxious countenance, mark the commencement of the attack. The patient feels a stiffness and rigidity of the muscles of the jaw; the tongue is affected. This rigidity extends to the abdominal muscles, with a pain striking inwards, as if the diaphragm were affected. The spasms become more universal, the more powerful muscles constraining the less.

[I have known the transverse tendons of the rectus abdominis torn across by the violent spasmodic actions of the muscles of the back!]

In the acute form of the disease, as it has presented to me, on the evening of the third day the spasms relax—he speaks more easily—he swallows—and you think him greatly improved, after which he sinks rapidly!

I fear it has been only in the milder form of the disease that authors have boasted of success.

The dressing has been the Peruvian balsam with laudanum; the solution of the lunar caustic; the warm cataplasm: and the general remedies, the warm bath and opium, and extensive fomentation

¹Read an Essay by Dr. Maclagan. The subject is treated methodically by Sir George Ballingall.

with tobacco to the spine and stomach. Under such treatment the patient has recovered; leaving the impression, however, on my mind, that I had to do only with the milder form of the disease.

They have been deficient in opportunities, or bad observers, who would confound tetanus and hydrophobia.

CHAPTER XI.

OF ULCERS.

An ulcer is an open secreting sore, substituted for the natural integument and cuticle. It arises from abrasion of the surface when the health is not perfect—from some cutaneous foulness, as a boil or pustule.

Any wound or abscess may become an ulcer; *i. e.* an open sore not tending to reunion, but partaking of some constitutional derangement.

When an ulcer rises without injury or abrasion, it is from a pustule or tubercle, or some form of cutaneous disease; that is, a small cutaneous abscess discharges, and instead of filling up and healing, its sides are everted, and become a secreting sore.

Ulcers are divided into common and specific; but this betrays imperfection. Ulcers are common enough, but the term has no meaning. By specific is meant scrofulous, carcinomatous, or syphilitic sores.

We have here to do with that ulcer which is unattended with any specific or definable disease of constitution, but which certainly depends on deranged health or imperfect circulation.

[You may rest assured, that when a sore is spontaneously formed on the upper part of the body, or on the outside of the thigh, the hip, or ham, it has a constitutional origin.

When a sore forms on the leg, and is obstinate, it may be constitutional, but very often it results from an imperfection of the circulation belonging to a depending part.]

Structure of an Ulcer.

An ulcer is attended with an absorption of the adipose membrane beneath and around it. Its edge is elevated by deposit of coagulable lymph, and these together make the sore appear deeper than it is actually. Its surface is covered with a film of coagulable lymph, and in this the changes are wrought which we have to notice. In this lymph the granulations are formed.

The *granulations* are those small red convex bodies which

appear on the surface of the ulcer. They secrete, and cover themselves with pus.

[You may see the granulations forming on the inflamed surface of a bone. You perceive on one day a matter on the surface like pale jelly, which you might wipe off; on the morrow it is fixed, and when you touch it it bleeds!

These granulations have no contractile power: though such an idea has arisen from the rapidity of their growth and decay.]

The granulations are healthy or otherwise, *i. e.* according as they tend or not to the restoration of the natural surface.

[When unhealthy, they are soft, spongy, and rise above the level; or they are pale, flat, and deficient in vigour.]

They partake of the nature of the action from which the ulcer arose—healthy, morbid, or specific.

It is of importance to notice the *welt* around the ulcer, for while it continues the ulcer will not heal. It has been described as a circumvallation which the ulcer throws up for defence: the idea is absurd, but it leads to a useful inference, that you must cause the absorption of this hard circle, or it will be in vain to attempt healing the sore.

Although the constitutional treatment of ulcer be the most important object, yet there are circumstances to be noticed which mislead you to consider that sore as constitutional or even malignant which is not so. This is the

Motion of the Part.

This must have your particular attention in treating ulcers.

[Thus a sore on the tongue will be occasioned and kept up by motion against a rugged tooth. Thus an ulcer of the lip will continue, get hard, and look angry, and yet be occasioned by a chop, irritated by continual motion. So will a sore in the groin be kept up, long after specific action has ceased, by friction in walking; and in the same way an ulcer on the ankle will be unmanageable, until the motion of the foot on the leg be stopped by the application of splints, &c.]

When there is no such local source of irritation, and an open sore refuses to heal under proper local treatment, general remedies must be employed.

In a book of surgery, I should not fill my pages with an imperfect view of the practice of medicine; which has been too much the custom. I repeat, if we are to have one sole prescription, let it be the blue pill and the bitter draught! But a better education must have taught you to inquire from what source the health has been deranged.

[Is it a puffy rich old gentleman with a running sore?—a pale mechanic?—a bloated drayman?—a young woman irregular, pale, and with swelled ankles?—Has your patient been abroad, and is he suffering from the sequelæ of formidable tropical dis-

eases?—Is he scorbutic, with hemorrhage, faintness, coldness, and numbness?]

Another question arises—is the sore to be healed in all cases?

[Suppose that you have repelled a herpetic eruption and sores, and the patient is taken with distressing asthmatic symptoms,—you could not be easy—you would be induced to make a pustular eruption; perhaps with a weak lotion of corrosive sublimate; or to use the tartar emetic ointment.]

When large ulcers are healing very rapidly, you must prevent the occurrence of other serious evils.

[Mr. Lawrence has said, that when in these circumstances full diet was allowed, apoplexy and palsy have followed the healing of the ulcer.

Old ulcers on the legs will not heal without blisters to the inside of the thigh above the knee. This sufficiently declares the relation.]

It is on the occasion of constitutional ulcers that you have to take the advice offered, page 53. Attend to all the signs of modified disease.

General Treatment.

It is not unnatural, seeing an extensive sore, a secreting surface, to order animal diet, wine, and porter. But this is generally wrong, and very often an inflammatory action supports the ulcer, and is in truth the cause. It is oftener necessary to reduce the diet, and perhaps to purge, or even to take blood.

[We have had patients brought into the hospital with spreading sores, in whom there has been every appearance of exhaustion in the haggard countenance; and yet without leeches around the sores, or general bleeding, we could not arrest the rapid progress of the ulceration and sloughing.]

The infusion of gentian, with senna and cardamom in a draught, with three grains of the blue pill, was Mr. Abernethy's prescription for many a day during the height of his practice.

Five grains of the *pil. hydrarg.* for three successive nights, followed with a warm purgative on the fourth morning, gives activity to the secretions, and unloads the canal. You may find it necessary to purge by small doses of emetic tartar: a grain of the emetic tartar in twelve ounces of water, and taken in spoonfuls, at regular intervals, until it purges or vomits, and let a cordial with an opiate succeed to this.

The appetite may be restored by a draught before dinner of infusion of gentian and of cloves, (caryoph. arom.,) with tincture of orange-peel and spirit. ammon. aromat.

On an out-patient day in the hospital, you have young women with sore legs, pale, sluggish, and chlorotic; to such you give, combined with a warm purgative, the *pil. ferri cum aloë*, or Griffith's mixture, or carbonate of iron with valerian. A young woman of

sedentary habits, having erythema and anasarca, her legs chequered with patches and streaks of red or purple,—after urging the bowels, join diuretics to bark, keep the legs up, and cover them with spirituous lotion.

To a bloated elderly man you administer an occasional warm purgative draught, with bitters and cordials, and the compound colocynth pill, with the addition of the blue pill at night.

In either sex attend to the breathing and the action of the kidneys, especially as the cure advances; and if there be paucity of urine, give the squill pill with mercury.

When a poor creature is out of health from damp lodging and bad food, do not give bark, but good nourishment—fresh vegetables and white wine.

In the scrofulous ulcer, you may begin with bark and soda, or iodine. In the irritable ulcer cicuta and calomel.

With children, and as an alterative, one fourth of a grain of calomel with chalk, or the *pulv. hydrarg. cum cretâ*, with an occasional mild laxative; or, suspending any preparations of mercury, substitute small does of ipecacuanha.

Ulcers of the Legs.

[You will learn nothing from Home on ulcers; he left the subject very imperfect, the dressing being wholly neglected. This led to the Essays of Baynton and Whately: they left out the treatment of the constitution, on which account London surgeons were indebted to Mr. Abernethy: but he, on the other hand, was indifferent to the proper surgery, or dressing of wounds and ulcers.

You must advance to this subject by considering the peculiarities of the circulation in the lower extremities,—the effect of position and motion,—the cause of varicose veins, and their effect.]

The circulation of the lower extremities being imperfect or weak, an accidental abrasion, a gnat bite, a mere scratch, becomes a sore.

[You will know when the sore arises from this defect of circulation, and consequent diminution of vigour of constitution of the part, from the state of the veins round the ulcer, and from the dark colour of the granulations, when the patient stands.

An old ulcer will be known by its callous edges, and the dark venous vascularity around it.

When the sore is deep and foul, with an abrupt sharp edge, you may look for a constitutional cause.]

We are inattentive to the *lex non scripta* of the profession. Sensible practitioners were at all times aware of the necessity of bandaging the sore leg. But before Baynton and Whately the treatment was not followed on principle, and therefore often negligently performed. A principal object in all dressing of ulcers of the leg is, to restore the vigour of the circulation by supporting the vessels.

In the dresser's box there should be certain articles, which he may require in his rounds. For example :

[Rollers—strapping—sheet-lead—caustic—blue-stone, or sulphate of copper—tincture of myrrh or of benzoin, or balsam of Peru—ceratum plumbi cum cretâ—ungt. resinæ flavæ—with red precipitate of mercury.

As to the first, learn to handle a roller neatly, taking care to turn it so as to correspond with the form of the limb ; and remember that the main object is to give a gentle and uniform pressure to the whole limb.

The strapping of adhesive plaster is another mode of supporting the veins and pressing down the welt. These slips are laid obliquely across, beginning below, and laying them over each other, in the form of the 18-tailed bandage. Lead I was wont to prefer ;—the thin sheet-lead, polished and clean, and laid on the ulcer, and extending over the parts around, and supported by the adhesive slips or the roller.

With regard to these stimulating applications, it is remarkable that an ulcer does not heal permanently unless a good constitution is given to the granulations. The tinctures are used when the granulations are pale and flabby.

When an ulcer is irritable, and anodyne fomentation and cataplasm have been used in vain, the balsam will often be found to agree, and destroy the morbid irritability.

The ceratum plumbi cum cretâ is the proper dressing to the healing margin, and to the parts healed ; while the ungt. resinæ flavæ is a proper dressing to the centre of the sore.

The caustic is applied to the surrounding welt, which is then poulticed ; this is when it is very callous.

A wash with the solution of the argentum nitratum will excite to the formation of cuticle ; and a lotion of the oxide of zinc will promote the healing of the excoriations and superficial ulcerations. The oxide of zinc $\mathfrak{z}\text{i}$. to $\mathfrak{z}\text{iii}$. of rose water. Shake the phial, for it is not a solution ; dab it on, and let it dry.]

Such are the uses of the contents of the dresser's box. Some ulcers require more particular attention.

[When an ulcer is very foul and sloughy, whilst you attend to the health, foment for half an hour, morning and evening, with decoction of chamomile and poppies, and in the interval apply a poultice, enjoining rest.

If it be sloughy and indolent, add muriate of ammonia to the decoction. If irritable, use extract. conii in the poultice, or powder of conium. If very offensive, use the carrot poultice, to which you may add some powdered charcoal.]

When the circulation has become excited, and the discharge promoted, relaxing applications must be disused, and the stimulating treatment substituted.

When the sore is offensive, with deep sloughs, and surrounded with dark erysipelas, put pledgets of lint which have been dipped

in camphorated oil into the chasm, and cover all with the fomenting poultice. Endeavour to draw off dark offensive stools, and then give bark and wine.

The irritable ulcer you will know by its not bearing the dressings. The edges are sharp and jagged. It has a whitish spongy bottom, with an ichorous discharge.

[For such an ulcer it has been common to give the cicuta pill. The local applications are,—the poultice with cicuta and opium, or the poultice of carbon and powdered opium. But these failing, as I have said, use the balsams. The dry irritable ulcer was first treated by Kirkland with balsam of Peru, and the effect was such as even to cure trismus.]

The indolent ulcer may be thus described: the surrounding skin is thick and prominent, the edge as if cut sharp and sodden; the circle within has no regular granulation, it has a dull red fibrous appearance. In addition to what has been recommended, the nitrous acid and water is used as a lotion.

Ulcera Verminosa.

It is the season, and the peculiar smell of certain ulcers, which attract the flies.

[Decoctions of bitter herbs, such as of wormwood and rue, are used; or solution of corrosive sublimate over the dressings. There is an old powder of aloes, myrrh, and nitre, recommended in "foul wormy ulcers." Attention to defend the parts will prevent the necessity of such things.]

Hospital Ulcer or Gangrene.—"Pourriture des Hôpitaux."

There are shocking histories under this head, which you would do well to read, in order to learn what neglect and bad atmosphere and crowded wards will produce. You may read of it in the history of the Hôtel Dieu, in Mr. J. Bell's work, Sir Gilbert Blane's Diseases of Seamen, Dr. Trotter's Medicina Nautica, Dr. Rollo on Diabetes, Dr. Thomson on Inflammation. The latest authors are, Drs. Boggie, Blackadder, and Hennen, and Mr. Copeland Hutchinson. As it has appeared to me, it is a bad erysipelatous inflammation, in which the ulcers run rapidly to mortification and sloughing, and is to be attributed to that undefined condition of the atmosphere when the wards are crowded in hot seasons.

Your attention is arrested by seeing the patient pale, sallow, low spirited, and with a heavy eye. On turning off the dressings, there is visible a dark bloody spot upon the granulations, and next day a foul cineritious slough covers the bottom of the sore. "A sore of the size of your hand becomes in twenty-four hours as large as the crown of your hat."

[Some of our most sensible writers treat of the hospital gangrene and sloughing phagedæna as the same disease.]

Mr. Lawrence has described a phagedænic sore of the nates and vulva in young women living in a state of prostitution—not venereal.

[He makes it out to be consequent on their miserable lives—cold, poorly clothed, irregularly fed, and seeking relief in intoxication. The state of the system reduced by small-pox brings on a similar condition. The cure is by mopping the sloughy surface with the nitrous acid.]

The Scorbatic Ulcer.

Let me at least make you aware of such an ulcer, although we see little of it. We see an approach to it in patients brought into hospitals from low damp cellars; for the disease arises from confined air, damp, distress and inactivity, and bad food, and deficiency of nourishment.

When in excess, the character of the constitution is shown in spongy bleeding gums, livid blotches and wheals on the skin, œdematous legs, and a bloated countenance. This is attended with lassitude, laborious breathing, and syncope.

The wound discharges fetid matter, with blood; often coagula cover the surface, below which the surface is soft and spongy, and a bloody fungus shoots out.

The treatment consists in proper food, with fruit, white wine, cider or spruce. The applications, lint dipped in strong decoction of bark, with the carrot poultice.

CHAPTER XII.

DISEASES OF BONE, INTRODUCTORY TO FRACTURE.

Inflammation of Bone.

The bones are subject to many diseases; they inflame from causes constitutional, as well as from external injuries. Inflammation in them is attended with a pain—dull, aching, and deep; arising slowly, and excruciating at last. In them inflammation gives rise to ulceration and carries; to abscess; to nodes; exostosis, and tumour; to exfoliation and necrosis.

The subject is, therefore, of great extent and interest. It requires weeks at lecture to discuss it: it requires demonstration of natural and diseased specimens in order to be intelligible. A written volume would leave the reader uninformed. Here, therefore, I restrict myself to practical remarks.

In inflammation of a bone, you consider from what constitutional

cause it arises, and treat it accordingly. Is the pain in the coverings? In the fascia, and rheumatic? Is it an affection of the bone itself, and syphilitic? Does it arise in a scrofulous constitution, threatening the various consequences of that condition?

[I do not object to the term *periostitis*. But I believe it to be a mistake to describe the periosteum as the seat of a disease distinct from the affection of the bone itself. There are reasons, and many analogies, to show why the superficially seated bones, are most subject to inflammation.]

Inflammation—in a long bone, for example—is to be treated on general principles: local bleeding and fomentation; leeches and blisters; and incisions through the periosteum: whilst calomel and opium and antimony combined, and colchicum, are the medical remedies. The division of the integuments and periosteum over the inflamed bone in many cases gives immediate and permanent relief.

On the same principle that you would open an abscess under a fascia, you require to trephine the bone when pus has formed in the centre.

[Read what Sir Benjamin Brodie has published on abscess in the tibia, *Med. Chir. Trans.*]

Much has been written to little purpose on caries.

[Because they do not define what is meant. A surgeon puts his probe into an ulcer, and he finds that he can force it into the bone, and he says "The bone is carious." What is this? A bone softened by inflammation, where the earth has been in part absorbed. Or, again, in probing, he feels the bone rough: "The bone is carious." In this latter case the bone is dead, deprived consequently of its coverings and periosteum—it is exfoliating. Or suppose that there is an ulcer on the leg which extends to the bone: "The bone is carious." Thus is caries any thing or nothing. The bone may participate in any disease, modified by the peculiarity of its composition, in possessing the hardening material, earth of bone.]

Having understood the nature of bone, you readily conceive that it is subject to all manner of disease, either originating in it, or communicated by the approximation of diseased structure to it.

[A bone, consisting of membrane, cartilage, and phosphate of lime, being deranged by morbid action, will exhibit some of its original properties, and become perhaps a *fibro-cartilaginous tumour*. Again, the marrow of the bone being of the nature of the fat, is subject to the same disease,—*osteo-steatoma*. The tumour, originally seated in the centre, gradually expands the shell, and bursting through it, feels soft and elastic. The surgeon mistakes it for a tumour of the soft parts, and attempts extirpation, until, carrying his scalpel deep, he strikes on the hard base of bone.]

In *osteo-steatoma*, *osteo-sarcoma*, *fungoid tumour*,¹ difficult questions occur.²

¹The same with medullary sarcoma of bone.

²Tumours originating in the bone require amputation, if we

except cystic tumours, which may be treated. But when the tumour is malignant, amputation will not save the life. You cannot promise success. For example, in the fungoid or medullary tumour, the constitution may have partaken of the disease. You inquire into the state of the glands, of the extremity, and of the state of the viscera, before you propose amputation; and too often, when giving the patient the chance of prolonged life by the operation, you find the disease showing itself in the stump.

Before a disease of a bone has arisen so as to be an external tumour, it has propagated itself internally along the cancelli. In amputating therefore, unless in the mildest chronic tumour, we should go above the joint into which the diseased bone enters.]

Exfoliation is the death and separation of a portion. It may be external or internal. The process may take place so as to separate the whole thickness, the extremity, or process of the bone. But the term *Necrosis*, though it means the death of the bone, is appropriated to a very peculiar effect of inflammation.

[The surface of a bone being injured, a thin layer only will be thrown off, like a leaf of bone, hence the term *exfoliation*; but it is in all cases the same process, an absorption of the living bone excited by the contact of the dead part.]

Necrosis may take place in any person when inflammation and suppuration affect the interior of the living bones; in compound fracture improperly treated, and in gunshot fracture.

[It takes place spontaneously in young people of a strumous habit. The thigh or leg inflames: fever accompanies this condition of the skin; abscess follows; the matter makes an exit, and there is a period of relief. Again, fever is ushered in by shivering; the limb swells up; it is firm in all its length; there is a new abscess and a new opening; and now a portion of bone comes away, which declares the deep source of the complaint. After many successive attacks, and long open sores, there comes away a large portion of bone, which on examination proves to be the whole shaft of the bone!]

In a bad stump, after amputation, the matter getting access to the centre of the bone, it inflames; new bone is formed round the old shaft; and after a tedious time, and much suffering, the shaft is withdrawn, and then happily the stump heals.

This is very much of the nature of our experiments; for by opening the bone of an animal or fowl, and introducing a foreign body into it, necrosis is produced. Read Dr. W. Hunter's First Cases, Med. Obser. and Inquiries.

The curious circumstance in this case is, that often the patient is walking about whilst the process is going on. The explanation of this is, first, that the cause is limited to the shaft of the bone; secondly, that the shell of new bone is formed by the inflammation of the old bone: and on the death of the old bone, the new one is capable of bearing the weight, and is united to the extremities of the old bone where they constitute the joints.

The most singular part of the process is the ulceration of the new shell, opening a passage for the wasted portion of the old shaft, viz. the *sequestrum*.]

An important question arises in those cases of spontaneous necrosis, for example, of the tibia—What ought to be done, and when should the operation be attempted?

The operation is this: the surgeon is prepared with trephines, saws, chisels, and forceps and bone-pliers. He makes an incision down to the bone, laying it largely bare. He then trephines it, so as to open a passage for the sequestrum. This probably requires to be done a second time, and the saw is used to divide the intervening bone. Then the sequestrum is drawn out.

[But too often I have seen it occur, that after these incisions and perforations have been made, with protracted suffering to the patient, the bone has been too firm to be brought away. This must be gravely considered by the surgeon, and he ought to be sure that the old bone is separated and lies loose in the shell before he operates; and let him remember that he is only completing a process which nature will accomplish without his aid, if time can be afforded. See Gunshot Fracture.

There is no reasoning on the subject of *necrosis* unless we go to the elements of anatomy, in which very few are properly initiated; or unless you make the experiments which I did in my early professional studies.]

Fragility of the Bone.

I am not assured that there is any such morbid condition of bone, except what arises from want of use and old age. When an old feeble lady, who has long kept her bed, trips off the carpet and falls on her haunch, the top of the thigh-bone is shattered like a piece of china.

[Bone must be exercised as well as muscle to be preserved perfect. There is always in the natural body a due correspondence between the active and resisting forces.]

When, on questioning a patient on the nature of the accident, you find that the force, on calculation, was not equal to the effect, as when a man stumbles from hitting his toe in going up stairs, and breaks his thigh-bone! you must think of the possibility of there being niollities ossium in the case.

[*Mollities, malacosteon*.—In that case there would be pains universally in the bones, with earthy deposit from the urine. The disease proceeds, I am afraid, unchecked by remedies. The disease is very slow in its progress, which therefore makes the observation of the effect of remedies difficult. Though attended with important consequences in the female, the disease is by no means peculiar to her. See the case of Thompson, Med. Obs. and Inquiries, for the ultimate effect of the disease. See also the Catalogue of the museum of the College of Surgeons for what I have observed.]

Rickets is a very different disease from mollities ossium. It is scrofula in one of its hundred shapes, and the most distressing.¹ The bones become soft and yield to pressure; yet, as to our present purpose, it is singular that, easily as the bones break, they notwithstanding readily unite.²

[¹ Rickets is a disease of childhood. It is preceded by unhealthy evacuations, a tumid belly, an enlarged liver, a sickly and pale countenance, and flabbiness of flesh. Then comes a peculiar form of head, enlarged extremities of bones, and distortion, first taking place near the ankles, then in the spine, and finally affecting every bone. See some curious and important observations by Mr. Shaw.

² I had a patient in the Middlesex Hospital who suffered fourteen fractures in succession. All of them united.]

CHAPTER XIII.

FRACTURES.

Short Review of what is to be attended to in Fractures of the Bones.

[This important practical division must be prefaced with much general discussion, on the structure, growth, diseases, of the bones—of the pathology of fracture, reunion, &c. There opens to the student a very interesting part of physiology, and a no less important part of pathology. These preliminary studies may then be summed up as in this section.]

The *student* has become acquainted with the structure and vascularity of bone—the cavities, shaft, and epiphysis—the impropriety of the term *callus*—the process of formation and of the reunion of bone, and the formal distinctions in fracture.

[It is as well to know the distinctions which authors have made of Fractures:—

1. Transverse.
2. Oblique—split longitudinally.
3. Double fracture.
4. Complicated—*e. g.* extending into a joint, or when an artery is wounded.
5. Comminuted—bruised into small fragments.
6. Compound fracture.
7. Gunshot fracture.

[These admit of remarks at lecture which are here unnecessary.]

As a *practitioner*, these are lessons which he must retain. The reunion of bone is a process of health. Your study must be to preserve the health, and to keep the parts in contact.

In all cases learn how the accident has occurred before you ex-

amine the limb: the nature of the violence and the direction of the force teach you what to expect. On examining the injured limb you are expected to declare an opinion, and inquiries *then* have the appearance of doubt and hesitation. Be careful in carrying the patient.

[If the patient must be carried home, let care be taken that the ends of the broken bone are not pushed past each other, to the effect of tearing the soft parts, and perhaps opening an artery. Lay pillows on each side of the limb, and sticks along these, bracing them with cords. If a sheet is used, it is slipped under the wounded man, and then fastened to polls; these are lifted in the fashion of a sedan chair. This carries him securely, but the sheet is apt to bag, and let him fall low, by which the limb is shortened, and the bones crushed together.]

When you lay out a limb to secure it during the night, or whilst the imprudent patient is drunk, it is common to do it with junks. Junks are nothing more than bundles of straw rolled up in a sheet. Fold the sheet so that its breadth shall equal the length of the limb; put bundles of straw on the ends, and roll them up till they nearly meet; place the leg between them, and tie the whole together with three distinct portions of roller. You double each piece of bandage, and lay it under the junks and limb; pass one of the ends through the loop, and then tie the ends together.]

Crepitus is, the grating of the broken extremities. If the surgeon does not feel the crepitus, this may be owing to the ends passing each other. Let him extend the limb, press the bones together, and rotate. Let him be careful to distinguish the sensation arising from an inflamed joint and the defect of synovia, from crepitus.

Setting the limb.—This is a foolish term, but the prejudices of society cannot be despised. Do not bandage the limb before the swelling has come on. The most serious consequences result from this imprudence;¹ and yet, if the limb be simply laid out with a cold lotion, the minds of relations are irritated with expectation.

[¹ Very early in life I picked up a poor lad in the street of Edinburgh who had fallen from a window. I carried him to the Infirmary. On visiting him next day I found they had bound up his broken arm with splints and roller. The hand was swollen: vesications were on the skin. The mischief was done in a night: the arm mortified and dropped off by the elbow. Notwithstanding my advice and constant precautions, in twenty-two years' attendance on a great hospital, I have witnessed the same imprudence many times attended with mortification and death.]

An assistant extends and smooths the limb. Soap plasters are put on each side (not around) where the splints are to be placed; they give a gentle support, and prevent chafing: soaked lint is laid so as to make the contour of the limb correspond with the straight splint.¹ The splints are placed on each side, and tied with the tapes or looped roller.²

[¹ The common splint is formed by glueing leather and thin lath

together, and then splitting the laths, so that they lie easily round the limb; but they do not correspond with the form of the limb, in the direction of its length. A straight splint cannot be made to touch and press equally (for example, the knee, the calf of the leg, and the ankle), you therefore model up the intervals with lint wet in spirits and vinegar. The best splint in the lesser fractures is soaked pasteboard, laid on, soft: it may be stiffened with white of egg.

² It may be proper to roll the whole limb; do it from below upwards; see that the limb is not bound too tight above. If the limb must be supported against œdema, I prefer distinct slips of bandage, put on like the 18-tailed bandage, so that they can be loosened or adjusted without disturbing the limb.]

The limb is then laid out in the easy posture, which is that of relaxation of the muscles.

There is no good reason for delaying the reduction of the fracture; that is, the placing of the bones in their just position, and as far as possible retaining them so; always with the precaution as to bandaging.

[A very wrong notion prevailed with some London surgeons, that as the bones were not fixed for some weeks, the setting of the limb was of no consequence till that period. As the process of reunion commences with the final adjustment of the bones, you are in danger of disturbing the process of formation of bone by this delay, and inducing the formation of a false joint by such an ignorant proceeding.]

The important distinction in fracture is the state of the soft parts. The limb may be bruised throughout its whole substance. The injury may be such to the deep parts that the limb is a sac of coagulum. The bone may be comminuted, or finally there may be,

Compound fracture.—Compound fracture is where the fractured bone is in communication with an outward wound of the integuments.

You must distinguish the case by the manner in which the wound has been made. The bone may have been thrust through the integuments, the force having been in the length of the bone, and the fracture oblique. It may have been made by a cutting instrument; or the wound may have been bruised, and the bone laid bare by a wheel or great weight.

The essential distinction is this, that when the integuments are opened, whether cut, or torn, or bruised, they inflame, and are subject to the disorder of the health. Hence suppuration; and this suppuration running deep involves the bones—the limb swells, and the fever runs to dangerous excess. In many cases it is practicable to convert the compound into the simple fracture, by procuring adhesion of the integuments. Take care, however, that in attempting this, you do not confine matter.

[When a deep suppuration surrounds the broken ends of the

bones, and especially if there be loose pieces, they do not live, they separate from the periosteum, and become of themselves sources of irritation and more intense inflammation. The remote consequence from this condition of the parts is necrosis.

It is in these circumstances most important to have a free exit for the matter. The wound should be opened so freely as to require no counter opening. If neglected in the beginning, counter openings are necessary. Nothing tends more to relieve the constitutional symptoms than freedom given to the matter.]

In the treatment of these accidents, the long confinement must be considered, and some things anticipated. If the patient be put into a common bed, it will in time sink low, and the limb will suffer displacement. Let a hair mattress be put over the feather bed, and let the ticking be drawn tight, and supported by boards below. An adjustment may now be made, which deferred, till inflammation shall have arisen, will give great pain; a drawing sheet may be thought of.

It may be necessary, from the violence of the injury, or the general shock, to use the lancet. But the practitioner must look forward to remote consequences, and consider the debility which will arise from long confinement, perhaps weakening suppurations.

The bowels must be discharged and preserved regular at all events, and care taken not to load the stomach. Opiates should be reserved for occasions, and not indulged in.

In fracture, towards the period of cure, it is of advantage to remove the bandages and readjust them, and to relieve the limb from them from time to time, the surgeon being present and watchful. It is of advantage also to change the posture, or to bend the neighbouring joint. Friction gently upwards relieves the œdema and assists the circulation. Attend to the parts which are pressed; defend them against inflammation and sloughing, especially the hip and heel. Bathe with salt and water, and spirits, and apply soap plasters, or a circular pad, to keep off pressure from the tender part.

When there is great injury in the case of compound fracture, or when the great joints are implicated, we have to fear, if there is great restlessness and depression, or if the pulse becomes frequent, the tongue dry, with tendency to delirium. This *delirium tremens* is too often the effect of these violent wounds.

[Great caution is necessary in this case, and great decision. You would imagine it to be a case for depletion, and the strict anti-phlogistic practice, when nothing but opium and stimulants are effectual.]

When the Fractured Bone remains ununited.

Think whether there be any intervening substance, and whether the bones be in contact; or whether there be any disorder in the

constitution to disturb the natural action of reunion. Too great freedom of motion may cause it.

[I have known dysentery, at the period of the union, cause a false joint. Pregnancy does not prevent the union of bone, as was supposed. Strange to say, rickets prevailing does not delay the reunion. See p. 62.]

1. Let the bones be more securely braced together, taking especial care not to apply bandages so as to impede the circulation.

2. Try Mr. Hunter's plan: put on firm splints, and raise the patient and put him on crutches, and make him bear upon the leg, even though it give some pain. After this let him again be put to bed; and rest for some time strictly enjoyed.

[Mr. Hunter's notion was, that the natural stimulus, or "stimulus to perfection," was wanting, and that the bone being put to its proper use, it would be excited to complete what was necessary to its function. We may understand the practice differently—as a mode of exciting to inflammation and the action of reunion—in the parts which had become indolent.]

3. The more formidable operation is the passing a seton between the bones.

[The invention of Dr. Physick. He had been a pupil of Hunter.]

In this operation we must not expect an immediate effect. The seton is kept in for months, and the harbinger of success is a swelling round the ends of the bones, and consolidation, by which the fracture becomes stiff.

[It succeeds in the humerus. It has succeeded in the thigh-bone, but very seldom.]

4. The more violent operation of exposing the ends of the bone, and sawing them off, has been often done without success. In some rare cases it has succeeded, and in fracture of the femur and tibia in my hands it has failed.

When the bones have remained long loose, their extremities waste to a point, and then there is no remedy.

Diastasis.

One species of fracture we may dismiss in these preliminary observations. Diastasis is separation of the epiphysis from the diaphysis or shaft of the bone.

[The reader must recall the knowledge of the original structure of a bone; that the ossification occurring in a distinct spot near the extremity of the cartilage, forms there a nucleus, which enlarging, becomes the articulating head of the bone; that this epiphysis is long united by cartilage to the shaft, and that this head may be twisted off.]

The accident occurs in childhood, or before the fourteenth year. I have known it occur in the humerus from a boy firing a musket; in the head of the thigh-bone from a fretful child casting himself

backwards whilst held in the nurse's arms. I have found it in the lower head of the femur; the leg of the boy having been caught in the spokes of the wheel whilst he was attempting to get upon the back of a carriage.

This form of diastasis, or of fracture, wants crepitus; and being a separation near the joint, it is apt to be mistaken for dislocation. The treatment is the same as for fracture of the bones. We expect the bones to unite by callus as in common fracture.

[If neglected in childhood, the lameness or deformity is great in after life.]

Of Gunshot Fracture.

If you have attended to what is delivered under the head of gunshot wounds, and these observations on compound fracture, there will require little to be said under this head.

When a musket ball strikes directly and forcibly upon the shaft of one of the long bones, it breaks it into pieces.

When it strikes the more spongy extremity, it more generally sinks into it and lodges.

When the shaft is broken, a distinction may be made, whether the ball has gone off, or whether it has passed quite through the bone, scattering the lesser pieces and driving them into the flesh. It is obvious that the latter is the more severe accident.

[Because there is a peculiar complication; these portions of bone make wounds which more readily inflame than that made by the track of the ball, and the tumefaction of the limb is very great and general.]

I found the Russian and Prussian surgeons dilating these wounds freely with the scalpel, a practice which I had not observed in the English army. There is no doubt in my mind that there is the most pressing necessity for such dilatation of the wound, and for the reason I have stated in *compound fracture*.

During the war, I had several officers under my observation who were suffering from necrosis, which they would have escaped had their wounds been freely enlarged at first.]

In fracture of the thigh-bone, the case is fearfully complicated with the inflammation of the mass of muscles. Mr. Guthrie, supported by other authorities of experience, considers the case one for amputation. The cases that I have seen, have been of the most desperate description; and, a fortnight after the wounds were received, the bone shattered, and the upper end sticking some inches from the wound. They demand amputation, and the patient in these circumstances seldom recovers.

When the ball sticks in the head of the bone, the joint becomes implicated, it anchyloses, but the patient is still subject to great exhaustion and hectic. If the wound closes, it opens again with new suppurations, and increase of suffering and fever. Whilst

there is uncertainty as to the position of the ball, amputation may be delayed, but to this it will come at last.

I have observed the most experienced army surgeons to make no hesitation in amputating, when the patella was penetrated by a musket ball. The same may be said of a shot piercing the capsule, and passing across the knee-joint.

[Read Amputation at the shoulder-joints, on the question of treating the head of the bone struck by musket shot.]

CHAPTER XIV.

FRACTURE OF THE THIGH-BONE.

Take the exemplification of these principles in *Fracture of the Thigh-bone*.

Hear all that can be said of the nature of the accident deliberately and attentively.

1. Has the force been applied to the fore-part of the thigh, as by a heavy wheel whilst the patient lay on the ground? Then the bone is simply fractured in the middle.—2. Has he fallen from a height on his feet? Being a young man, you have an oblique fracture of the shaft.—3. If an elderly person, then in all probability the cervix is broken.—4. Is it an old woman, who stumbling, has fallen on her haunch? Then the trochanter and neck is broken, external to the capsule.

Now, turning down the bed-clothes, if you see the limb shorter, and the foot turned out, it is a fracture of the thigh-bone. To examine the nature of the fracture, you make an assistant secure the pelvis. You draw out the limb, bending the knee-joint; you rotate, when the crepitus is felt.

[Fracture may be expected in age; dislocation in youth. Fracture may be expected in woman; dislocation in man, *i. e. cæteris paribus*.]

If your suspicion fall on the cervix and trochanter, you alter your position. Your assistant rotates the limb whilst you fix the pelvis, and marking the superior spinous process of the ilium, and placing the thumb upon it, you place your fingers on the great trochanter. The trochanter major is higher and less prominent than natural. It is closer to the back of the ilium. As the rotation is made you feel the crepitus, and you feel that the bone does not roll from under your fingers in the same manner as when, the cervix being entire, the bone moves upon the head lodged in the acetabulum. You can extend the limb, and it retracts again.

There being no crepitus felt, you make the assistant draw out or extend the limb, and then rotate.

There being still an uncertainty,¹ you make the patient stand on his feet, and pressing strongly on the trochanter, you make him raise the sound limb from the ground, when the weight falling on the cervix, if it be fractured, it will be declared.

[¹ The muscles acting on the shaft push up the great trochanter, and shorten the limb. But sometimes the extremity of the shaft is so entangled, that it is not so displaced, and this mark of fracture is absent, till you make the patient stand.

Sir Astley Cooper makes three species of fracture of the neck of the thigh-bone; 1. Through the cervix; 2. At the root of the cervix and outside the capsule; 3. Through the trochanter major. The real distinction, as to the question of reunion, is simply, is it within or without the capsule?

The subject has taken a curious course. The ingenious Mr. Cross of Norwich being my house pupil and diligent student, goes to Paris. There he finds them at fault in this matter, and embodies his notes of my lecture in the form of criticism. The Parisian surgeons take it up, the English rejoin, and so the matter assumes a needless degree of importance,—the question being, whether the neck of the bone does reunite. Now, certainly it does not, unless it be broken external to the capsule, and then there is blood extravasated, inflammation, consolidation, callus formed, and ultimately bone!

After perusing Sir A. Cooper's volume, read Mr. Guthrie's observations, Med. Chir. Trans. vol. xiii. I have so often exhausted my breath on this subject, that I might have thought Mr. G.'s observations unnecessary.

Look also to the Dublin Reports.

Read a paper by Mr. Stanley, Med. Chir. Trans. vol. xiii. on Fracture of the Trochanter Major, and its resemblance to dislocations of the head of the femur.

Consult Mr. Syme's paper, Ed. Med. Journ. April 1826.

Above all, attend to the important series of dissections by Mr. Hawship, Med. Chir. Trans. vol. xix. a great many old women falling and striking the trochanter.

It is a very uncommon fracture which leaves the muscles so attached to the shaft as to turn the foot inwards.]

The fracture may take place low down in the thigh-bone, and extend into the knee-joint. This will happen when the patient falls on the knee or on his feet, when the outer condyle of the femur is broken off.

Treatment.—See that the patient has a mattress under him; that the canvass is well laced, and not likely to yield.

In the fracture of the shaft, the means recommended by Mr. Pott are not approved of. Lay the thigh on the inclined plane, or some substitute for it. In that posture the patient will be easy.

Pay such attention as to assure the patient he is not neglected; but do not finally *set* the limb until the tumefaction has taken place.

In setting or finally adjusting the bones, see by due comparison

of the limbs that the fractured one is of due length and just position. 1. Lay soap-plaster along the outside and inside of the thigh. 2. Roll it. 3. Place your splints along, one from the trochanter to the head of the fibula; a shorter one on the inside: brace these together with the looped bandage. 4. Lay the limb on the inclined plane. 5. Guard the heel; pad up carefully behind the knee; and above all watch that there does not arise œdema of the lower limb from the bandage or the gravitation of the limb.

[I put twelve specimens of fractured thigh-bone into a case. All of them exhibited the upper portion of the bone projecting forwards beyond the lower portion. (*The reason is obvious. See Amputation of the Thigh.*) It is very difficult to hold down and restrain this upper portion; much easier to raise the lower to it; therefore the inclined plane is to be preferred, because it does this without the necessity of restraint.]

Towards the end of the month remove the splints and readjust the bandage, raise and extend the limb, and lay it slowly and carefully down, and so secure it with the long splint, which extends from the hip to the heel. Take care that the limb is not twisted (for the callus is yet soft), either by the falling outward of the foot, or by the patient changing his posture from lying on the side to lying on his back.

If the fracture extends into the joint of the knee the case is formidable, and the surgeon gains little credit. The antiphlogistic treatment in all its severity must be employed, and means must be taken to avoid the falling in of the knee. The limb must be kept straight with a splint on the outside of the knee, and a roller above and below the knee.

[In uniting, the outer condyle is apt to be attached higher than natural, and consequently the articulating surface of the thigh-bone is oblique, and the joint yields inward. This strains the inner lateral ligament, and produces a state of this joint weak and subject to be sprained and inflamed.]

Towards the end, the knee-joint must be gently moved from time to time, to prevent ankylosis.

In fracture of the cervix, lay the thigh on the inclined plane: lay compresses on the trochanter, and swathe the pelvis, so as to bear gently on the trochanter.

[Do not expect a union by bone unless the neck of the bone be split. But as there is ever during life an uncertainty as to the actual condition of the parts, treat your patient as if union were expected.]

The accident proves very fatal to old people.]

If the trochanter be broken off, employ a broad web of canvass, drawing with buckles round the pelvis, so as to bear upon firm compresses placed on the side of the prominent bone; and to extend the limb, and support it against falling outward, the long splint may be employed.

Fracture of the Patella.

Your patient tells you he is convinced that his knee never touched the ground; that he slipped, and was recovering himself.

On inspecting the knee, it is flat; the patella is broken across; the two parts are asunder; and the condyles of the thigh-bone being exposed, there are four prominences, which produce the peculiar flatness.

Observe, above all things, the difference of the case when the patella is broken by a blow, (*e. g.* the kick of a horse,) or by the person falling and hitting the knee, as I have known in a coachman thrown from the box, and falling with his knee on the bolt.

[Mr. Trotter's coachman fell thus, and broke the patella; he was brought to the hospital, when there was a new house-surgeon. There were three cases of broken patella in the house, bandaged according to rule; he did the like with this unfortunate man—inflammation, and abscess, and fever, was the consequence, and death.]

In the former case you may bandage early, there being little inflammation: the bandage is destruction in the latter case.

[In the case of fracture by a blow, the extravasation of blood, the inflammation and condensation of parts, gives rise to union by bone. When the patella is broken across the convexity of the trochlea by the mere action of muscles, you must not expect union by bone, *although you are to attempt it*; at all events, the closer the fragments of bone are, the better. But take care that you do not, by the awkward application of the bandage, twist round the fragments, so as to present an unequal surface towards the joint.]

Treatment.—In the common case, place the patient so as to relax the quadriceps muscle; raise the body so as to bring the pelvis forward, and extend the leg; put no firmer bandage about the knee than you can make with a neckcloth; wait to see that no great inflammation or tumefaction arise.

When satisfied of this, apply the proper apparatus.

[Mr. Lonsdale contrived a very effectual instrument. It is a circular steel ring, padded, and with a cushion; on this cushion a screw operates, so as to fix it just above the upper fragment of the patella. The circular ring and cushion are then drawn down by straps to a circular which goes round below the knee. I gave him several patients on whom to apply this apparatus, and the cures were very good; even giving hopes of union by bone.]

When this instrument is not at hand, a pad and roller is put round the thigh above the retracted portion; a roller is also put round below the knee; straps are then slipped under these, so that they lie parallel to the ligament of the patella: these being tied and drawn, bring down the upper fragment towards the lower. But trust most to the position of the body and limbs.

For a long time the patient should wear a support and knee-cap, lest a slip should break the knee-pan again.

[I have known the integuments torn along with the ligamentous union, and the joint laid open by a transverse wound.

It is not unfrequent to find a patient with both patellæ broken! Is it that the weakness of one limb, and consequent stumbling, causes the second accident?]

Fracture of the Bones of the Leg.

Care must be taken to prevent the extremities of the fractured portions from pressing through the skin.¹ Lay the limb on the side, the foot extended, and the knee bent; or lay it on the inclined plane long since invented by Dr. Aitkin, a surgeon and lecturer of Edinburgh. Towards the end of the cure, and when the callus has united the bones, the patient may be relieved by laying the limb in an extended position. Sometimes this position suits from the beginning, preventing the upper portion of bone from being thrust out against the integuments.² In all cases guard against the foot gravitating outwards.³

[The muscles of the leg being posterior to the bones, they, in their contraction, force forward the fractured ends. The upper portion will be found to project.

² When the leg is placed in this position, protect the heel by placing it in a *nest*.

³ Compare the position of the foot with that of the knee, and see that the splint supports the outside of the foot.]

Compound Fracture of the Tibia.

When the tibia is broken, and the end thrust through the integuments, it is difficult to reduce the bone. Free incisions being good of themselves in compound fracture, rather open the skin and fascia than saw the bone.

[When a portion of the tibia is taken off with the saw, the fibula keeps the ends of the bones apart, and a false joint is formed. It is better, therefore, to save the bone if possible, and to make free with the integuments.

In reducing the bone, do not draw so as to extend the leg in one line from the knee to the heel; but keeping the upper part firm, incline the lower a little obliquely backwards. This relaxes the muscles behind the bone. You may then introduce the lever between the extremities of the broken bone, and bring the leg into the straight line.]

When a sharp spicula of bone projects from a compound fracture, it should be notched with the saw, and nipped across with the bone forceps.

If the ends of the bones be found in their place, or if they are easily reduced, you may attempt to heal the integuments. By this

the case is reduced to a simple fracture. But if a suppuration has taken place, then open both the integuments and fascia.

Fracture of the Head of the Tibia extending into the Joint.

In this case the straight position of the limb is to be preferred. The danger is from high inflammation of the knee-joint. Anchylosis is to be apprehended.

Fracture of the Fibula.¹

Hear the account of the accident: the person has missed a step—or his foot has gone into a hole—or he has attempted to drop from a height, *i. e.* the force has fallen perpendicular, and the inner ankle yielding, the weight has come upon the fibula.

It is generally broken about two inches from its lower head.

[Placing the thumb upon the part, it yields and declares the fracture. But the fracture may be ascertained otherwise, if on moving the foot, rotating it, and turning it outwards, there is pain, not in the joint, but two or three inches upwards. Again, if on pressing the fibula towards the tibia at a point removed, there be pain, then the bone is fractured.]

Examine the inner ankle, and see whether the deltoid ligament be torn or sprained.

["Only the small bone of the leg broken, that is all!" but for your own credit explain that the chief injury is at the ankle, and that long after the bone is knit there will be weakness there. Better break two bones than sprain one ligament.]

There may be a partial dislocation of the bones of the leg from the astragalus. The reduction is difficult.

[The bones slip forwards, the heel projects, and the instep is shortened.]

There may be compound dislocation of the ankle and fracture of the fibula.¹ Lay the leg on the outside on the proper splint, pad up the inequalities with lint dipped in spirits and water, taking care not to press on the ends of the bone. Look to the position of the foot, in regard to the knee-joint, and preserve the great toe in a line with the patella.²

[¹ In compound dislocation of the ankle, the important question is, How has it been done? A wheel passing over the ankle and opening the joint, is a case for amputation. On the contrary, if a young man, leaping from a carriage, suffers a compound dislocation of the ankle, the foot may be saved.

Further, to show the resources of nature, the astragalus has been taken away, and the foot saved. In these cases all will depend on the age and constitution of the patient.

¹ The common term *Pott's fracture* directs you to a good practical book, the works of Mr. Pott.

² See Dislocations.]

The *lower end of the tibia* is sometimes fractured within the ankle-joint, or the *malleolus internus* broken off. The foot is inclined inwards, and the crepitus distinct. The soaked pasteboard splint should be applied on the inside of the ankle, the long splint and foot-piece on the outside. Every attention must be paid to prevent inflammation rising in the joint.

When the inflammation has subsided, the position of the foot must be accurately surveyed; and it may be necessary to place the leg in the inclined fracture-box, padded behind, and resting on the heel. The sole of the foot is braced to a splint, and this is adjusted with tapes pinned to the mattress.

FRACTURES OF THE UPPER EXTREMITIES.

Fracture of the Clavicle.

This is the most frequent accident of the kind. Being unattended with any serious consequence, the patient is unruly, and hence deformity.

If you find the shoulder discoloured, or at least hurt, a hundred to one, the man has pitched upon his shoulder.

[When the shoulder is discoloured by a blow, you may expect fracture; when there is pain and lameness, without direct injury, you may expect dislocation.]

You find the acromial portion of the clavicle depressed, and the shoulder low. The sternal portion is supported, and perhaps a little elevated, by the action of the sterno-cleido mastoideus.

[The action of the pectoralis and latissimus assist in depressing the shoulder, and drawing it towards the body. Set the patient propped with his back towards you, and you will perceive the depression.]

There is an apparatus which effectually serves the purpose of setting this bone. That not being at hand, proceed, 1. To elevate the depressed acromial portion; 2. To counteract the riding of the fractured extremities.

Placing soft cushions in the axilla, lay the double-headed roller across the back, and bring it round under the arm-pits. Then form the figure 8 behind, so as to brace back the shoulders; a pad¹ being placed high between the arm and side. The roller is next used to raise the elbow and keep it to the side.²

[¹ Perhaps the term pad may be wrong, since, if it be thrust into the arm-pit (where it acts as a fulcrum, the humerus as a lever), it may produce numbness by compressing the nerves and blood-vessels. But if a long compress, rolled up on the edges, be placed between the arm and side, it must extend the shoulder outwards, which is the object desired.

² Do not disgrace yourself by placing a compress on the fractured extremities. If you put a plaster there, it must be for keeping off

the patient's fingers, who, by touching and pressing, inflames the skin over the sharp bone.]

Fracture of the Acromion.

The man has pitched upon the shoulder, or a weight has fallen on the joint of the shoulder; he feels as if the arm had suddenly become heavier. Distinguish between this accident and dislocation of the acromion from the clavicle: distinguish it also from dislocation of the humerus.¹ Feel for the spine of the scapula; feel along to the point of the shoulder, there the bone sinks; push up the humerus into the joint and the bone is raised; and thus you are made sensible of the crepitus.²

[¹ It happens sometimes that the acromion is broken, and the end of the clavicle dislocated. The accident is rare, and very troublesome. See dislocation of the clavicle.

² Or raise the elbow from the side, and rotate. The connection of the deltoid produces crepitus.]

You use the spica bandage, and you apply a handkerchief or roller so as to raise the elbow. This is for the purpose of raising the fractured portion by means of the head of the humerus.

If the ligamentous covering of the bone is not sufficient to keep the fragment in contact, and the middle portion of the deltoid muscle pulls upon it, it will be necessary to lay the patient in bed, and to have the arm removed from the side, so as to relax the deltoid.¹ If he must be moving about, a pillow should be put between the elbow and the side,² which will have the effect of relaxing the deltoid muscle.

[¹ If the acromion should unite in a depressed position, it would prevent the humerus from being elevated, and limit the motions of the joint. Unless attention be paid during the cure, the fragment will unite by ligament only.

² If you push the pillow too far up into the axilla, you will push off the fragment from its proper connections.]

Fracture of the Body of the Scapula.

For example, the lower angle being broken off, it is drawn forwards by the serratus magnus. It cannot be restrained; therefore, by managing the position of the arm, you contrive that the scapula shall be made to follow the fragment.

Generally you place the centre of the palm on the nipple of the opposite side, and bandage the arm in that position.

Fracture of the Neck of the Scapula.

You will be apt to mistake this accident for the more common one of dislocation, owing to the head of the humerus falling off from the acromion.

You distinguish it by the greater mobility of the parts, and by the crepitus on rolling the arm whilst you grasp the shoulder.

In setting it, pad up the axilla, and support the elbow; use the spica bandage.

Fracture of the Humerus.

It is the most simple of all when fractured in the middle.

When fractured at the neck, you may mistake it for dislocation.

[The united action of the pectoral muscle and latissimus dorsi draw the end of the humerus into the axilla.

Placing the fingers in the axilla and pressing the elbow to the side, the fractured end will be brought into contact, and crepitus felt.]

Extend or pull down the elbow; lay on the splints, one extending on the outside to the shoulder, the other on the inside, and up to the axilla. After securing them, place a long narrow cushion between the arm and the side, and bend the arm to the side. The elbow may hang; the support being a sling round the neck, supporting the wrist.

[But let the important distinction be noticed—it is the powerful deltoid muscle which retracts the lower portion of bone when the humerus is fractured above the insertion of that muscle. The powerful action of the muscle may make it necessary to relax it, by confining the patient to bed, in order that the arm may be removed from the side. This position effectually relaxes the muscle.]

Fracture through the Trochlea and across the Fossa.

Take care to distinguish this accident from dislocation of the ulna and radius backwards. The ease with which the parts may be extended and reduced to form will enable you to distinguish it. When the arm is thus extended, crepitus will be felt.

The best splints are formed of moulded pasteboard. Begin early to move the joint, or you will have ankylosis.

Oblique Fracture through the Fossa and into the Elbow Joint.

By falling on the projection of the elbow, the olecranon communicating the shock breaks off the condyle, and splits up the trochlea.

See that, in setting it, you prevent obliquity in the position of the bones; which would twist the fore-arm, and produce deformity and weakness.

Bend the joint early with care, else you will have ankylosis.

[This is an unlucky case for a young practitioner. The inflammation runs high; and stiffness of the joint and deformity is likely to be the result.]

Fracture of the Bones of the Fore-arm.

Of the Olecranon.—It takes place by falling and striking the elbow on the pavement, as when one holding something precious in the hand is desirous of saving it. The prominence is gone, a soft swelling is in its place, and the finger sinks into the joint. The tendon of the triceps has drawn up the fragment. You can move it with ease laterally, but without relaxing the muscle you cannot pull it down. There can therefore be no crepitus.

[Although the process be here broken off by the external injury, yet practically the analogy with the case of fractured patella is complete. The fragment does not unite with the bone by bone, but by ligament.

The object to be kept in view is to place the surfaces in contact. By extending the arm too much you displace the fragment, and perhaps place it awry. If you bend the arm too much, you separate the fragment and exceedingly weaken the joint, subjecting it to frequent sprains.]

Cut a narrow roller, laying a slip on each side of the olecranon; place an oblong compress over them, and a little higher than the fractured portion. These, as well as the roller, should be wet. Support them with two or three turns of the roller. Cut it off, and stretching the slips, roll also below the joint; then bring the ends of the slips down, draw and fix them, so that they at once secure the olecranon from a lateral shift and draw it down. Place a compress on the fore part of the joint and a splint, and roll over all; and this is done to keep the arm moderately extended.

[The meaning of placing the compress under the splint is to let the elbow-joint be bent in a very slight degree.]

Begin early to move the joint, just so much as to prevent consolidation.

If the shaft of the ulna be broken, it will be by the force acting directly upon it. This fracture is to be treated on the general principles.

Fracture of the Radius.

This is a very common occurrence; for, when a person falls forwards on the palms of his hands, the shock comes upon the radius alone, and often the ulna escapes.

If you observe the defect which follows this accident, it will suggest the proper practice. Two flat splints are used; the inner one extending along the palm of the hand.

[If the ulnar edge of the hand be too much raised, as it will necessarily be by a straight splint coming along the under side of the fore-arm, the hand will be raised, the extreme end of the radius pressed, and the fractured extremities depressed (assisted by the action of the quadratus). The result of this is ankylosis of the two bones, and more certainly an awkward position of the hand. Again,

if the hand be permitted to turn into the prone position, the lower broken end rolls away from the upper portion; and being fixed thus, the rotating motions of pronation and supination are lost; for the extreme portion of the radius is in pronation, and the nearer portion in supination; and in this position they are fixed.

This is the reason why the hand is permitted to drop so as to counteract the action of the *pronator quadratus*.

When all is right in the setting, the patient may counteract every thing by placing his hand in a sling! If a sling is used, take care that the hand hangs free of it.]

Fracture of the Radius near the Wrist.

This is very common. The bone snaps close to the edge of the *pronator quadratus*.

It is often mistaken for sprain and partial dislocation. A wrong position of the hand, and permanent weakness of the wrist, is the consequence. It requires two firm straight splints, well braced together.

[Let it be remembered that this fracture is often combined with dislocation of the head of the ulna.]

Fracture of the Bones of the Hand.

These are easily distinguished, with the exception of fractures of the further ends of the metacarpal bones, which in their symptoms much resemble dislocation.

In treating these you may take the recommendation which has been given of using a ball, which is to be grasped, and the fingers and hand bound down over it with a roller.

Fracture of the Bones of the Pelvis.

If the great arch of these bones be broken, it implies great violence, and thus imminent danger of life.

[Generally in workmen or miners, by the falling of a bank of earth.]

When the ossa pubis are broken down, the urethra may be torn. This will be indicated by blood flowing from the urethra. Try the catheter, with every possible precaution. But it will probably hitch into the rupture. If it cannot be passed, and the urine is retained, an incision should be made in the perineum towards the neck of the bladder. If the urine escape into the cellular membrane, it leaves no hope of recovery.

[It spreads wide round the broken bones, and under the peritoneum, and into the pelvis.]

The *fracture of the ala ilii* is much less formidable. The position must be studied, so that the abdominal muscles do not pull off the fragment.

Fracture of the Ribs and Sternum.

[You will remember that in fracture of the skull, spine, and ribs, the contained parts constitute the consideration of importance. Here, for example, the state of the lungs, pleura, and motions of the ribs, form the proper subject of prefatory study.]

An elderly gentleman, in reaching for a book in his library, falls with his side against the corner of a table. He breathes with pain, and has pain in turning. Is it fracture of a rib, or merely a bruise of the serratus magnus?

The ribs may be broken by pressure on the chest; and then they are cracked, as when a bow is overbent. Press upon the rib anterior or posterior to the point hurt; if the rib be broken you will give pain, but not if it be only a bruise. Place your hand over the suspected part, and make the person breathe freely; if the rib be broken you will feel the crepitus.

The accident is most frequent in advanced years.

[The cartilages in a young person are throughout cartilaginous and elastic; the ribs themselves in youth possess elasticity, and hence they bend, and yielding escape fracture.]

In this accident you bleed, and swathe the chest, and enjoin rest; and relieve the tickling cough.

[Observe, there are two good reasons for using the lancet: 1. To keep off inflammation from the membranes and lungs; 2. To reduce the circulation to such a degree that you may bandage the chest, and keep the ribs at rest. If you roll or swathe the thorax, and so stop the expansion of the chest, and throw the act of breathing altogether on the diaphragm, you make the patient suffer all the horrors of suffocation; since there is a call for full inspiration in proportion as the circulation is full.]

By neglect of proper precautions very serious consequences follow this simple fracture.

[I have known the fracture of three ribs, neglected, cause great mischief. An abscess formed under the pectoralis muscle; pus was also found in the chest and in the pericardium. To be sure the patient must have been strumous; but do not such patients break their ribs?]

If much oppression arise, with an inability to lie down, especially when the rib has been beaten in, as by the blow of a boxer, feel for emphysema under the roller.

[I do not remember to have seen the intercostal artery torn unless where there was an open wound; but it is possible. Effusion of serum into the cavity of the chest is more probable.]

When emphysema occurs, the patient must be watched. Slight degrees occur frequently, and terminate well without any thing being done. But it may increase to an alarming or fatal degree.

Punctures with the lancet may be made, and the air in the exterior cellular membrane pressed towards it. But the dangerous condition is from the air pent up within the cavity of the chest;

and if the patient start up from bed in fear of suffocation, and breathe with difficulty, heaving his chest with that peculiar twist of his body that indicates distention of one cavity of the chest; more than scarification must be done: an incision opposite to the fractured rib must be made, so free as to allow the air readily to escape from the chest.

[As it is natural that the reader should turn to such an authority as Dupuytren, I am forced to say that his clinical lecture on the subject is a string of blunders and misconceptions.

A person will exist with extensive emphysema extending upwards to the eyelids and down to the scrotum! But the danger arises from the air distending the cavity of the chest so much as to impede the action of the diaphragm, and to press over the mediastinum, so that the opposite side is also oppressed; then the breathing becomes difficult in a dangerous degree, and the patient may die suddenly. Giving vent to the air on the wounded side relieves the whole apparatus of expiration.]

Fracture of the Sternum.

The fracture of the sternum implies great violence, and is highly dangerous from the importance of the parts beneath. Whilst every means calculated to ward off inflammation is employed, and to relieve cough, which in these cases has the worst effects, by agitating the fractured portions, the case is to be treated as the fractured rib. I have had patients who recovered.

Fracture of the Jaw.

The lower jaw is broken by a fall; or by a blow, as in boxing. It may be broken in two places; being in this respect in the condition of an arch.

It is known by the displacement or inequality of the range of the teeth, by the pain and crepitus. If broken in the place of the symphysis, the muscles of sides being balanced, there is little displacement. There is more when the base is broken opposite to the canine tooth, for then the lesser division is more displaced.

An instrument has been contrived which makes a very perfect cure. It consists of a semicircular piece, which embraces the teeth, whilst another grooved semicircular piece catches under the chin. These are united by a screw, which brings the bones to a level, and holds them firm.

If this should not be at hand, the base of the jaw and the chin are to be covered with softened pasteboard, and this afterwards covered with white of egg.

This being properly retained for a time, hardens, and makes a proper splint. The jaw, in addition, is secured by the split double-headed roller. The centre of the bandage has a slit, which admits the chin. Two of the four tails go up around the head; the two others go round the neck near the occiput.

If the teeth be imperfect, so as to produce an inequality in the jaw when bound up, the defect is supplied by thin pieces of cork interposed between the teeth.

Fracture of the Ossa Nasi.

There is great tumefaction, and consequent uncertainty as to the state of the bone. The practice is to introduce a strong probe, or other suitable instrument, and with this within, and the fingers on the outside, to raise and model up the bones. Unless this be carefully done, there is great deformity when the swelling subsides. The swelling of the surrounding soft parts preserves the bones in their place.

CHAPTER XV.

THE CONDITIONS OF THE SPINE, ITS ACCIDENTS AND DISEASES.

The spinal column is of the highest interest to the surgeon, as it contains the most vital organ of all; and, as it is the centre of the skeleton, its condition is of the first importance. Even when not affected by disease, properly speaking, but distorted by mere debility and indolence, it affects the thorax, and consequently the breathing and the constitutional powers. The treatment of distortion, therefore, should not be left in the hands of the mere mechanic.

§ I.—*The Distortion of young Females, chiefly of the educated ranks of society.*

1. We find this distortion in young women from eleven to sixteen.

[After this the spine fixes, be it straight or be it distorted, and the cure is hardly practicable.]

2. The mother or governess brings the young lady to you, on account of a projection of the shoulder, or perhaps because one of the mammæ is larger than the other.

[I have seen the mark of leeches and of blisters to the shoulder! Sad proof of imperfect education in our profession.]

3. As the patient comes into the room, her gait is awkward, and there is a projection of the left os ilii and of the hip.

4. Let her be stripped, and a shawl thrown over the neck and breast; and now, looking on the back, you mark the curve of the spine: take your pen and touch the spinous processes of the vertebræ, from the vertebra prominens to the sacrum.

5. Place the cord of her stays on the spine of the vertebræ of the

neck, and draw it tense to that of the sacrum. You now perceive that the dotted line takes the curve of the italic *f*; and you measure its deviation below to the left side; above, to the right side.

You hope to see the amendment marked by the diminution of the spaces between the straight and the dotted line.

The effect of this deviation from the straight line of the spine becomes apparent. In consequence of the concavity to the left side, the ribs converge; and this side of the thorax is contracted. A corresponding divergence, consequent on the convexity of the spine towards the right side, throws up the ribs. The left shoulder, therefore, lies on a diminished convexity of the chest; the right shoulder stands prominent, in consequence of the increased convexity of that side of the chest.

But as the thorax, formed of the ribs and sternum, is an entire circle, the cartilages of the ribs are squeezed out on the left side: and the breast, if the girl be of age, is more prominent.

[A certain degree of distortion is so common, that it is generally said the left mamma is larger than the right.]

Now, look to the lower vertebræ of the back; perhaps there you find a more acute turn, which is to be noticed, not as indicative of disease, but as a form of deviation not so easily remedied. Of serve, too, that whilst the spine is thus curved in the form of the italic *f*, it is at the same time twisted. The transverse processes of the vertebræ of the loins are brought so far round, as to render prominent the long muscles on the left side of the spine.

Consequences.—If this condition of the spine be neglected, a girl whom nature intended for a fine young woman becomes an “object.” She is shorter than she should be, and necessarily awkward in her movements. Often the distortion fixes in a moderate degree; being observed only in the manner in which she thrusts her shoulder forward, and in the prominence of the hip; but very often the lungs suffer compression and the constitutional strength is undermined.

Precaution.—Distinguish this *lateral distortion* of the spine from rickets; from scrofulous caries of the vertebræ; from original malformation of the thorax; and from distortion consequent on vomica or empyema, attended with diminution of one side of the thorax.

In these last cases the spine takes a curve; not the cause but the consequence of the state of the thorax.

Cause.—This curve is attributable—1. to the time of life when the peculiarities of the female system begin to disturb the constitution; 2. to natural indolence and the confinement incident to education inconsiderately pursued.

A young person lounging indolently stands naturally on the left foot, throwing the right into a position of relaxation. The effect of this is to incline the pelvis, on which as on a basis the spine rests. The spine is projected to the left side at its lower part, and, to preserve the balance, the body is twisted to the opposite side, above.

To correct it.—1. Attend to the constitutional indisposition. Let there be freedom of exercise. Let her dance, run, jump; but no

lounging; no standing; not even sitting; but all lessons to be taken whilst lying on the inclined plane.

2. Let her sleep on a firm mattress and low pillow, and change the side on which she sleeps.

3. If she rides let the pommel of the saddle be made to turn so that she may change her seat; one day to the left, the next to the right.

4. To exercise the spine in the manner described three times a day, and to be sponged and rubbed on the spine and loins after exercise; and to use the Indian clubs; or,

5. If the case be bad, nothing will promise a cure but the exercise and regulations, connected with inclined plane.

[That described in Mr. Shaw's book on this subject.]

6. The advantage of those exercises, friction and Champooing, is remarkable in improving the state of the skin, increasing the appetite, and confirming the "constitution."

An important consideration offers itself here to the practitioner. How does it happen that so many young ladies are laid upon the inclined plane or horizontal position, and remain so confined for many tedious months, having no disease of the spine?

[Many have I known so put down for twelve or eighteen months; then come hysterical weakness, strange anomalous symptoms, paralysis, &c.; and the health at this critical period is quite destroyed.]

It proceeds from the irritation on the uterine organs, attended with pain in the loins; which pain is attributable to disease of the spine. Let the practitioner study the causes of those pains—the uterus, the colon, the kidney—for all these induce distress in the loins, and distinguish these from affections of the spinal column or spinal cord.

[Few conditions are more apt to deceive than the state of the spine in a hysterical girl. You touch a spinal process, and she flies up with the expression of the most exquisite pain. If this be taken for disease of bone, and be treated accordingly, by confinement in the horizontal posture, the consequences are lamentable.]

§ II. *Curvature of the Spine, with Caries.*¹

This is the more formidable disease. It implies a scrofulous constitution, unless it has arisen from a severe accident.

[No doubt a slight spasm is often the immediate cause. Thus a child throwing itself back whilst held in the nurse's arms, sprains the joining of the dorsal and lumbar vertebræ, and gives occasion to a scrofulous caries, commencing in the ligaments.

I have known the disease produced in a man of sixty, from

¹ What is Caries? Certainly it does not mean either death or rottenness of the bone here, but that scrofulous inflammation, which, together with pressure, to which the vertebræ are subject, is attended with absorption.

a twist of the body (being a powerful man) in throwing himself from a stumbling horse.]

The disease may occur in any part of the spine; most frequently at the joining of the dorsal and lumbar vertebræ. It is most distressing and formidable when it takes place in the upper vertebræ of the neck.

Suppose that it presents in a child.—1. See that you remember the natural appearance of a child's back, and do not run into mistakes.

[Thus I have seen issues put on each side of the *vertebra prominens*, while there was no disease.

In an infant, the loins project when it is sitting on its mother's knee, just at the joining of the back and loins.]

2. Do not mistake a nervous debility for that paralysis which arises from disease of the bone affecting the spinal marrow.¹ Inquire into the state of the bowels, and whether there have been green purging stools with spasms.

[Nothing more common in children about the period of weaning than a flaccidity of the lower extremities, or total want of muscular power. I rather wonder that Abernethy should particularise two cases.]

3. The mother tells you that the child had the use of its limbs, could stand and spring up, but now the flesh is soft, feels woolly, and when she sets him upon his feet they sink under him.

4. You examine the spine, whether it be tender, whether the child twists and cries on pressing a particular part.

5. And if that part have the integuments puffed and swoln, so that the processes of the vertebræ are obscured, the disease is a commencing caries in the bodies of the vertebræ.

Treatment.—You can hardly treat a young child by medicine. Give it a few drops of the liquor potassæ in beef tea. Case its body in leather so as to prevent the motion of the inflamed vertebræ, and apply caustic on each side of the prominent part of the spine. Let the child be carried horizontally.

[Let the child have the warm salt bath. Sponged with the muriate of ammonia in solution with spirits. As medicine, vinum ferri: The pulvis sodæ, cum hydrargyro and rhubarb;¹ infus. cort. cascarillæ with soda: As laxative, the tincture of aloes in syrup of orange-peel.

The disease in youth.—The lad trips and falls frequently. He is ill and hectic, easily fatigued, and complains of his loins. He seeks the recumbent posture; or, in walking, leans for support; or lays hold of his knees with his hands, to take off the pressure from the spine. He is subject to spasms in the legs and thighs.

When the lower extremities are affected, he is sensible of losing power more than sensibility.

¹ Or. ꝑ Sodæ carbonat. gr. vi.

Ferri præcip. gr. i.

Pulv. Rhei, gr. ii. Ft. pulvis ter quotidie sumend.

The spine is tender when touched.¹ The integuments are a little puffed. By-and-by the spines project and declare what is taking place. Evening fever and the other symptoms of hectic prevail.²

[¹ You spread the fingers over the part, and strike upon your knuckles; the percussion reaches the inflamed spine.

² Sir Benjamin Brodie says: "There is scarcely any disease which presents itself under a greater number of forms." Is it not rather that many symptoms are attributed to this which arise from different causes?]

When abscess anterior to the spine takes place,¹ which is a very common accompaniment of the more severe form of the disease, the anterior crural nerves may be included in the inflammation and give rise to another train of symptoms.²

[¹ By referring to chronic abscess, it will appear that there is anterior to the spine that condition of the cellular membrane which may be the seat of abscess, independent of disease of the bones.

² Pains extending down the thigh.]

We have to distinguish from this disease what is vulgarly called *creeping palsy* of the lower extremities.

[This disease, however, belongs to mature years. See the Nervous System, Appendix.]

Treatment.—1. In these cases, it is of the utmost consequence to avoid pressure and friction of the inflamed surface of the vertebræ against each other. The body should, therefore, be incased and supported.

[I earnestly recommend you to observe that this is very different from raising the body by means of collars, &c. when absorption has taken place, and when by lifting the upper portion of the spine from the lower a gap is left. In such a case we cannot expect a cure; since that can only be accomplished by ankylosis of the surface. And there is danger in the use of such an apparatus as Jones's collar, from the body being suffered to sink down suddenly; whereby the spine may be injured.]

2. If the disease be advanced, and curvature has taken place, the mattress must be hollowed out to receive the projecting spine; so that the patient may be permitted to lie on the back without pressing on the inflamed parts.

[There are ingenious beds contrived for this purpose, admitting the part to be dressed, and the bowels to be relieved, *e. g.* Earle's bed. But he is no surgeon who, being in the country, cannot contrive something to serve the purpose.]

3. I find no reason for giving up the use of issues in this complaint.

[In the use of blisters and issues, the surgeon will take care to notice whether they be producing feverish irritation; in which case they must be dispensed with.]

4. Leeches to be applied on any accession of pain and fever. Stimulating fomentation or embrocation also are proper.

[But in general, the diathesis or condition of these patients forbids bleeding.]

5. The medical treatment will embrace good diet, and great care of the evacuations; tonics, and all the means we possess of giving constitutional strength.

[As, sulph. quin. in vinum ferri; spongia usta with iodin; infus. gentianæ with tinct. columbæ and liquor potassæ; solutio muriatis calcis.]

The harbinger of success is the return of appetite; the freedom from fever; the subsidence of the puffy swelling; the returning motion of the extremities. The cure is by ankylosis.

[The loss of voluntary power, we have noticed, is more obvious than the loss of sensibility. Sir B. Brodie says, the loss of sensibility is occasionally the accompaniment of the loss of motion. The reason of the motion being lost in a greater degree than sensation is, that the paralysis is not from pressure, (for pressure would affect the whole spinal marrow equally,) but from the inflammation of the bodies of the vertebræ on the anterior column of the spinal marrow.

The paralysis often precedes the curvature, and is often removed, the curvature remaining.

It is observed that, when caries in the vertebræ is produced by pressure, as in aneurism or tumour, there is no paralysis. The reason is, that there is little inflammation in these cases.]

Inflammation and Ulceration in the Atlas and Vertebra Dentata.

Children are subject to this complaint. It is not unfrequently mistaken. The complaint probably begins from some violent or awkward turn of the head, owing to the greater size of the child's head and smaller neck. No apprehension of the condition of the part is entertained by the mother. But the child cries when it is raised—cries when it is laid down—cries when the head is turned from the nurse's shoulder. It is feverish and fretful.

The essential part of the treatment is the fixing of the child's head, and drawing of a seton under the occiput.

[I have on these occasions contrived a collar that fills up the space between the shoulders of the child and ears, which supports the chin and the occiput. This affords indescribable relief; for now, in whatever posture the child is placed, in the nurse's arms or on the pillow, the head is prevented from moving and jarring the diseased articulations.]

Inflammation of the Spinal Nerves.

I wish to draw attention by this title—to an extraordinary degree of pain and susceptibility, which I am willing to attribute to the inflammation of the vascular membranes of the spinal marrow, and

which is to be relieved by leeching the spine, and by stimulating embrocation.

[Allaying the pain by a pill of conium, hyoscyamus, and compound ipecacuanha.]

Actual inflammatory pain must be distinguished from the symptoms which attend hysteria.

§ III. *Fracture and Dislocation of the Spine, and Injury of the Spinal Marrow.*

Fracture of the spine is the most formidable injury to which we are liable, without the immediate extinction of life. It may not perhaps appear to be very useful to present melancholy examples of this truth ; but the fracture of the spine, great as the injury is, still affords some hope of cure, and that hope may be increased by proper treatment. There are, besides, some vague unsettled notions which prevail on this subject, and which demand examination.

Case of Fracture of the Spine, fatal.

[Sept. 12th, 1816.—Auton, 25 years of age, a plasterer. This young man fell from a height of forty feet, and in his descent his back struck against the corner of a stone stair about eighteen feet from the ground. When brought to the hospital, a swelling was to be felt over the lower dorsal vertebræ. On pressing the finger deep, a depression, or interval, betwixt the spinous processes could be distinguished. He complained of great pain in the part, and all over the abdomen. He breathed naturally, and was perfectly sensible: there was no defect of motion or of feeling in the lower extremities.

He was bled to sixteen ounces: twelve leeches were applied to his back ; and he had a dose of the house physic.

13th. He has passed a restless night. He is in great pain ; he vomits every thing he takes ; the purgative mixture was rejected, and he has had no relief in his bowels. An enema ordered.

14th. He is delirious ; his pulse frequent, not full ; his skin hot. He passes his fæces and urine involuntarily ; but there is no flaccidity of the abdominal muscles, and he has the perfect use of his limbs.

15th. This young man's condition is very threatening ; his pulse is 136. He was delirious during the night, and threw himself out of bed. He is now in a state of extraordinary excitement, and although he has full motion of the limbs, yet the spine is undoubtedly broken, or crushed, and he will, I fear, die with the symptoms of the last case, and from the same cause, suppuration within the tube of the spine.

Evening. He is delirious, and like a man who is good-tempered in his cups ; he talks continually, and invites the nurse to bed to

him with very gay discourse. His stools and urine still pass involuntarily; pulse 130; weak.

17th. It has been necessary to tie him down in bed. He now appears dying; his breathing is very quick and laboured; his pulse hurried; his countenance is sunk, and his tongue is covered with a brown fur.

About an hour before death, a change took place from that happy delirium; and, groaning as in much pain, he fell insensible, and died.]

The eleventh dorsal vertebra was fractured in its body. The spinous process of the same vertebra was crushed. The spinal marrow did not appear to have suffered mechanically, or to have been crushed. Pus thick in consistence, and of a greenish colour, lay betwixt the sheath and the spinal marrow. There was an effusion of serum betwixt the membranes of the brain.

Subluxation of the Spine.

[Sarah Beddoes, 18 years old. This girl was thrown from a window two stories high; her back struck the ground. When brought into the hospital, great tumefaction appeared opposite to the lower dorsal vertebra. One of the spinous processes was found to be crushed, and the spine, above and below, stood remarkably prominent. The lower extremities were not paralytic, nor the belly tumid, nor the bladder distended: her sufferings were confined to her back and loins. A wound was found at the bottom of the sacrum, which ran upwards, to the extent of four or five inches. It appeared to have been made by her falling on a spike or long nail.—A dozen leeches were immediately applied to the part injured, and repeated for three successive days.

It would be tedious to give the unvarying journal of this case. She was long supposed to be in the utmost danger, from the violence of the injury; for weeks she lay complaining and moaning in a pitiable state, in all which time nothing could be done but repeating the leeches, the fomentations, and poultices, which gave some relief, and administering the saline mixture of the house, with occasional laxatives and opiates.

For three months she lay on her side, with her body bent forwards and her knees drawn up. This was her posture of ease. It was then discovered that she had, in addition to her other misfortunes, syphilis. So that being treated for this, she was altogether eight months under our observation; and from her emaciation, the nature of the case could be comprehended: it was a subluxation. Diastasis, or separation of the vertebræ, had taken place, and the articulating processes stood opposed to each other, causing a gap between the spines. In time the articulating processes being absorbed, and accommodating themselves to their new position, she regained her erect posture.]

Fracture of the Spine, fatal.

[Thomas Wills, aged 30, admitted Sept. 24.—Being on the top of a neighbour's house, extinguishing a fire, he fell a height of two stories, and came with his back upon the pavement. No injury to the spine was to be felt, but he had lost sensation and motion in all the lower part of his body and lower extremities. The bladder and intestines were insensible to their natural stimuli: he complained of a pain in his back, and referred it to the middle dorsal vertebra.

He remained for six days in this condition; blood was repeatedly drawn, by cupping, from the sides of the spine; his bladder was emptied by the catheter twice a day, and he had a stimulating enema thrown up at regular intervals. Liniments were rubbed on the extremities, which, however, could serve no purpose but to ease the patient's mind.

When he had been in the hospital for six days, his breathing became more affected, and he had a slight hacking cough. Emulsions, expectorants, and opiates, gave no relief. He was bled freely from the arm. The symptoms continuing and the blood being buffy, venesection was repeated: but the relief was not lasting nor indeed very obvious. For the pain in the side, and the difficulty of breathing, a blister was applied to the side. He had a mixture containing the *mistura salina*, *tinctura scillæ*, and *æther*.

About this time a consultation was held, and I was induced attentively to observe his condition. He was quite sensible and collected, the lower extremities lay without motion, and quite insensible. The belly was full, but exhibited an unusual flaccidity; the respiration was performed by the heaving of the chest; and there was a catch in his breathing, from pain running round his ribs on a line with the injury of the spine. That the spine was injured appeared, not only from these symptoms, but also from a certain degree of depression of several of the spinous processes of the vertebræ of the back.

Repeated scarifications and cupping on the injured part of the spine were ordered.

Oct. 8th. In the evening his respiration became very rapid, being sixty to the minute. Ten ounces of blood were drawn from the arm, but without relief. The *fæces* passed involuntarily, the respiration became slower, and he died.

Dissection.—Much coagulated blood lay over the sixth and seventh dorsal vertebræ, and the spinous processes of these vertebræ were broken, the tube of the spine was forced in upon the spinal marrow, and a sharp portion of the bone had pierced and lay pressing upon the spinal marrow; a rib was fractured on the left side, the broken extremity of which pressed against the pleura. This side of the chest showed marks of inflammation.¹

¹ It is important to observe, that the splinter which crushed the spinal marrow belonged to the body of the vertebra. It could not have been removed by operation.

Sudden Death from Disease of the Spine.

[— —, about thirty years of age, was brought into the hospital on Monday the 22d July. He was found in Portland Road, fallen in a fit; and brought by strangers to the hospital. When brought in he was discovered to be quite dead: frothy blood appeared at his mouth, and it was supposed to have come from his lungs.

On examining the body nothing unusual was observed in the abdomen and head, or in the viscera of the thorax: but on turning back the lungs a tumour appeared in the posterior mediastinum, exactly resembling an aneurism of the descending aorta. On prosecuting the matter further, however, the aorta was observed running close upon the tumour, but not making part of it. On opening the sac it was found to contain a thick mass of scrofulous matter, in contact with a carious portion of the spine. On clearing the matter away, the bodies of the vertebræ were found to be eroded, and the intervertebral substance also destroyed in part, so that the spinal marrow was exposed.

From his sister I learned that he had that day taken a long walk into the city; that, after such walks on former occasions, he would complain of great pain in his back; that all the complaint which he had was this pain in his back, for which he had taken the advice of many doctors, but nothing had relieved him. On further question, she allowed that he was subject to a palpitation, which was sometimes very distressing. He had experienced no impediment to swallowing, notwithstanding the tumour seemed to press upon the œsophagus, and no difficulty of breathing.]

Case of Diastasis or Subluxation of the Spine, fatal.

[March 29, 1816.—Marshal, a coal waggoner, was brought into the hospital from Edgeware; the account given by the people who brought him, was rather confused. They agreed that he had been riding on the fore-shaft of his cart, and, by a sudden jerk, was thrown off, and pitched on the back of his neck and shoulders. The man was somewhat intoxicated, and could not give a distinct description of what befel him. When carried into the hospital he was put upon his legs, but he could not stand; and when supported by the shoulders, he dragged his legs after him. At this time he complained of pain in his loins, but no injury was perceptible there. Between his shoulders, however, there was a degree of swelling and discoloration. Some of the people who were with him said that the wheel of the cart, which was empty, had gone over the small of his back; but after the first day he never complained of that part. Leeches were applied to the spine betwixt the shoulders, and his bowels were opened.

For nearly a week he lay without complaining of any thing,

except stiffness in the back part of his neck, and up to this period he had no symptom of paralysis; on the contrary, he could throw his arms and legs about, and retain his fæces and urine, and expel them naturally.

On the eighth day he was almost instantaneously seized with convulsions over the whole body. He was relieved, in some degree, by bleeding, and continued sensible, though his jaw was locked.

His pulse at this time was very strong. Two hours after the first bleeding the convulsions were returning with more violence, when he was bled a second time. A few minutes after the second bleeding his lower jaw moved with great rapidity, and continued moving in an extraordinary manner for nearly five minutes, when all at once he exclaimed, with great animation, that he could speak. From the moment he began to speak he appeared to be maniacal, for his expressions had by no means the appearance of common delirium: at this juncture he clearly proved, by his exertions, that he was not paralytic, for it required two men to hold him, and he almost sprung out of bed to be revenged on the nurse. He passed a great deal of fæces and flatus with singular force, for he evidently had the command of the sphincter, saying, at the time, with a smile, Beg pardon, Dr. —, while he indeed used little ceremony. On raising him up to put on the strait waistcoat, he complained of pain in the back of his neck, but as there had been a blister on it we could not, from his description, understand whether it was the pressure on the skin, or something internal of which he complained. In the course of an hour he was perfectly composed, so that, from the first attack of the convulsions to his being again sensible, a period elapsed of twelve hours. In the morning he had such marked typhoid symptoms that the physicians were called to him; at this time he had so far regained his senses, that he answered questions pretty distinctly, but when left to repose fell into a low delirium. On the third day after the attack of convulsions, he complained of difficulty in using his arm; and two days after he had total palsy of the lower extremities; he altogether lost the feeling in them, which was the more remarkable, as at this time he regained the use of his arm. He lived for a week after this, but continued sinking, and still retaining about him much of the character of typhus fever. The day before his death he was perfectly sensible, and had recovered sensation in his legs; for he could feel the rubbing of a finger upon them. At this time, though he appeared to pass his fæces involuntarily, still he passed them with great force, and he was able to reject an enema which was given contrary to his desire.

Dissection.—The brain was examined carefully, and nothing was remarked except a little effusion between the pia mater and tunica arachnoidea. On cutting the muscles by the side of the last cervical vertebra a little pus oozed out; it was found to come from between the vertebræ. On dissecting up the muscles, there was found to be an evident loosening of the last cervical from the

first dorsal vertebra. A few of the dorsal and cervical vertebræ were removed, and then it was distinctly seen that there was a considerable space between the last cervical and first dorsal vertebra; the intervertebral substance was completely destroyed, and an immense quantity of pus surrounded them. On the back part the pus had extended under the scapula, and on the fore-part was bounded by the œsophagus. On examining the spinal canal, the pus was found to have dropped down through the whole length of the sheath to the cauda equina.]

Observations on the last case.—Authors considering the strength of the intervertebral substance, have said, that the dislocation of the bodies of the vertebræ from each other was impossible. It is true, that commonly the body of the vertebra gives way before the ligaments yield. But here is an instance of diastasis or subluxation of the bodies of two of the vertebræ. From Hippocrates to the multitude of French authors who have touched upon this subject, dislocation has been considered in no other light formidable, than as producing pressure on the spinal marrow. But this case serves well to show, that luxation will prove fatal, even although the spinal marrow be not bruised.

The last writer who treats of this subject, is M. Boyer. He observes, that in the violent bending forward of the spine, the ligamenta interspinalia are sometimes ruptured, but that no bad consequence results; rest restores the part. But the rupture of the ligamentum subflavum (*ligament jaune*) is followed by paraplegia and death, and without doubt, he adds, it is because the spinal marrow itself suffers distention. The foregoing case will place this matter in another light. It is the progress of inflammation to the spinal marrow, and not the pressure or the extension of it, which makes those cases of subluxation and breach of the continuity of the tube fatal. The alternation of symptoms in this case is worthy of attention.

Dislocation of the Processus Dentatus of the second Vertebra suddenly fatal.

[A man was trundling a wheelbarrow in Goodge street, near the hospital; in wheeling it from the roadway upon the pavement, he felt some difficulty, and had once or twice drawn it back to give it the more powerful impetus. When at last the slight incumbrance was overcome, the barrow went suddenly from under him, and he fell with his chin upon the curb stone: he was instantly motionless, and although it was only a few yards to the hospital, when brought in, he was quite dead. Upon dissection, it was found that the tooth-like process of the second vertebra, which threads the ring of the atlas, had broken from the hold of its ligaments; and, the transverse ligament yielding, the process had crushed the medulla oblongata.]

This sudden death will remind you of the different effects of an

injury to the spine, as it happens to be higher or lower on the column. When the fracture is low, it is attended with loss of sensibility and motion in the lower extremities, and disorder of the bladder; when the injury is higher up, the abdomen suffers more distention; still higher, the respiration is affected; and when the fracture is above the principal origin of the phrenic nerve, the act of respiration is stopped, and death from suffocation suddenly follows.

Case of Injury of the Spine, attended with affection of the Lower Extremities.

[Finekin, aged twenty-three. It appears that he fell down a shaft full forty feet deep: he complains of having hurt his back. There is uneasiness and defect of action in the lower extremities. Ordered a laxative mixture, and to be repeatedly cupped by the side of the vertebræ of the loins.

About eight days after his reception into the hospital he began to complain of languor and universal pain; of sickness and debility. His pulse was quick, and his skin hot. It presently appeared that he had an attack of typhus fever, and he was sent into the physician's ward. Three weeks afterwards I was called to him; he had recovered from his fever, but still complained of pain in his loins, or torpor of his lower extremities. I again ordered scarifications and cupping in the extent of the spine, and stimulating liniments: he was discharged relieved.]

Injury of the Spinal Marrow from a hurt on the Spine.

[A respectable tradesman, in mounting curtains to a window, fell from the steps, and struck the lower part of the spine against the corner of a table. The bruise was severe, but he got the better of it by the usual remedies, and in the usual time. It was some months after, that he began to feel a want of power over the lower extremities; indeed, the nature of this affection being a want of the full power of motion, and a defect of feeling, he did not attribute it to his former accident, the more especially as so long a time had elapsed before these symptoms appeared.

This man is about fifty: square, and stoutly formed, and of regular habits; seldom exceeding his pot of porter. His arms are so powerful that even now he can mount a ladder, drawing his more unwieldy extremities after him. He is active in mind and body, and the only apparent defect is in the exercise of the will over the lower extremities, for they have not shrunk nor lost muscular firmness.

When I first saw this man, I conceived that these symptoms might proceed from disorder of the lower part of the great intestines. From such a source of internal irritation there are very singular sensations of pain, and numbness about the hips, and stiffness

and spasm of the lower extremities. I therefore gave him calomel, with occasional purges of neutral salts. But when, after a period of two years, I was called in to consultation, and learned that outline of the case which I have delivered, I advised more moderate living, leeches to be applied along the course of the spine from time to time, and issues to be formed by caustic opposite to the lowest lumbar vertebra. I have no doubt that these means have, and will continue to prolong his life, and the enjoyment of that limited power of the lower extremities which he now possesses.]

These two last cases recall to mind one of the most interesting of the kind on record, that of the Count de Lordat, in the *Medical Observations and Inquiries*, Vol. III. He was overturned, and had his neck twisted in the corner of his carriage; after the accident he served two campaigns; sufficient evidence of the slow progress of that paralysis, which encroached at last gradually on every bodily function. The report is very striking. He appeared stooping, emaciated, and dejected: he could still walk with the assistance of a cane in a tottering manner: his left hand and arm were much reduced, and he could hardly perform any motion with them, the saliva was continually trickling from his mouth, and he had neither the power of retaining it nor of spitting it out freely. What words he still could utter were monosyllables, and these came out after much struggle with a violent expiration, and in a low voice and indistinct articulation. In the last stage the functions were more and more oppressed, and often he was threatened with suffocation. Upon examination the membranes of the spinal marrow were found thick and tough, and the marrow itself had acquired an extraordinary degree of solidity. The symptoms of the two slighter cases of palsy, which we have here, are, I imagine, to be explained on the same principle, viz., the injury to the soft envelope of the spinal marrow and the accession of inflammatory thickening. Such slighter injuries to the spine have produced a scrofulous tumour, which, insinuating betwixt the processes of the bone, have at last oppressed the spinal marrow.—*Med. Obser. Inq.* vol. iii. p. 160.

Review of the Cases of Fractured Spine.

It is remarkable that a subject of this magnitude should have so little attracted the attention of the profession. I do not know to what books I can direct you; for authors have treated of the subject very superficially, and we have only some occasional cases in our books.

The cases which I have noted for your observation, make it evident that in injuries of the spine the danger to be apprehended is the same with that which accompanies injury to the brain; viz. the rising of inflammation, and the suppuration within the theca. This indicates the necessity of repeated general bleeding, or constant local bleeding while the danger continues. We also see the

necessity of controlling the motions of the patient, whether at first, as in the state of inebriety; or afterwards, when delirious.

The first question which it is necessary to agitate is this: how far does the analogy hold in fracture and depression of the skull, and fracture of the spine with crushing of the spinal marrow?

I have not found a young surgeon who has entertained any doubt on this question; and some, who have just proceeded so far in their studies as to know why the depressed portion of the skull is to be elevated, I have found very decided in their opinions, considering the operation as equally fit to be adopted in fracture and crushing of the spine. They confidently ask, Where is the difference? A bone is injuring the brain, and it is raised: a portion of bone is depressed upon the spinal marrow: let an incision be made and the portion of bone withdrawn!

They are encouraged in this by disquisitions in dictionaries of surgery, and by the discussions of lecturers. M. Boyer, the latest French authority on the subject, objects to the proposal only on this ground, that the indication is never sufficiently clear to authorise the operation, and our English authors object, because we might mistake concussion for fracture.

1. Now it is my belief that an incision through the skin and muscles covering the spine, and the withdrawing of a portion of the circle of bone, which surrounds the marrow, would be inevitably fatal. For it is not sufficiently observed, that the membranes of the spinal marrow are the most susceptible of inflammation and suppuration of the whole frame; not exceeded by those of the brain itself, of which they are prolongations. The cases before us afford indeed sufficient evidence on this head.

2. It further appears to me that the analogy on which this practice is proposed, is false; and that in truth there is no resemblance in the cases. When a portion of the skull is depressed, a comparatively small portion of the brain is injured by the intrusion; and were it possible to take away the part of the brain bruised by the bone, the function of the organ would remain entire. But when a portion of bone has crushed the spinal marrow, the entire diameter of the cord is crushed; and although it be but a small portion which has suffered, the injury of that portion is sufficient to cut off all connection betwixt the parts above and below.

3. Nay, even if it were a sharp spine of fractured bone which had run into the spinal marrow (supposing that the injury then produced were sufficient to cause palsy of the lower parts of the frame) before that sharp spine of bone could be withdrawn, the circumstances would be so aggravated by the exposure of the spinal marrow, that inflammation, suppuration, and death, would be the inevitable consequence. Instead of diminishing the danger, the unhappy fate of the patient would be accelerated.

4. These cases show how inaccurately the diagnosis of authors have been drawn. What tyro will not readily answer, that para-

plegia, and distention of the bladder and intestines, are the immediate consequences of fracture of the spine?

Yet we see here instances of fracture of the entire body of the vertebræ, without such symptoms as can inform us of the nature of the accident. And in the progress of the case we see symptoms arising, which no one has hitherto pointed out as proceeding from affection of the spinal marrow. Instead of loss of motion and feeling, you have seen the patient tossing in restless agony; an agony of mind without any definable suffering. Instead of palsy confining his lower extremities, you find him throwing himself suddenly out of bed, and at last rising in a wild delirium, which our observations hitherto would not lead us to expect, as a consequence of that sort of injury which is for the most part attended with loss of sense and motion.

5. The dissection in those cases proves the nature of this excitement. The great injury done to the spine, to the bone, is followed by inflammation, which is rapidly propagated along the membranes of the spinal marrow; and as is the nature of these involving membranes of the nervous matter, when inflamed, suppuration rapidly follows: and in the present example we find the pus dropping out from the sheath when cut across at a part far distant from the fracture.

Hence we see the cause of the general irritation, and of the oppression or palsy which follows.

The inflammation of the spinal marrow is attended with an almost universal nervous irritation, which is presently followed by excitement of the brain; in the mean time, matter is poured out into the sheath of the spinal marrow,—either by its pressure causing palsy, or by its irritation disturbing the function of the part, so as to be attended with the same consequences. The excitement of the brain being followed by effusion, death ensues.

6. There remains a question of some moment, and on which, in discussion with my learned brethren of the profession, I have had the misfortune to disagree. A man who receives an injury of the spine recovers from the immediate effects of the accident; but at the distance of months, instead of having the full use of the lower extremities restored, he begins to drag them more and more, and at length becomes totally palsied in the lower extremities, and languishes and dies.

I have heard it proposed by very high professional authority, to cut down upon the spine and apply the trephine and raise the bone. This appears to me a most desperate measure.

In the first place, it is not proved that it is the bone which presses on the spinal marrow. Indeed, I am confident, that in these protracted cases, when the palsy increases slowly, it is the thickening of the membrane which encroaches on the spinal marrow; or a diseased action which proceeds gradually, more and more affecting the nervous matter itself.

It may be said, that although the pressure is produced by the

thickened envelope of the spinal marrow, still it is the confinement of the bone which causes the membranes to press in upon the spinal marrow ; and if, by taking away the part of the tube of bone which confines the membranes, freedom were given to them, the spinal marrow would be freed from pressure. But this is an idea too mechanical. On the other hand, I offer this view : the palsy is a consequence of the swelling of the membranes, and proceeds from inflammation ; and if you cut down upon the bone, and saw it out, and expose these membranes, you will not only increase the swelling and thickening of the involving membranes, but you will most probably raise such direct inflammation and mischief, as to cut off the patient suddenly.

What, then,—are we to do nothing in these desperate circumstances ? I do conceive the case to be desperate ; but that does not authorise us to attempt a remedy which is not only desperate, but which will not stand examination, and which affords to me, I confess, no hope. We are to take up the case as a scrofulous inflammation of the spine, and I am certain that much may be done by prosecuting the cure with energy and perseverance, by local bleeding and deep issues.

[These cases and observations on fracture of the spine were written many years ago, in Hospital Reports. The subject of injury to the spinal marrow may be followed out by reading the papers in the Nervous System.]

CHAPTER XVI.

§ I. INJURIES OF THE HEAD.

There is no concealing the difficulty of assigning the right rule of practice in cases of injuries of the head.

You have first to consider the condition of the brain ; secondly, the forms of the skull, and the provisions for the safety of the brain. These form the proper introductory studies ; and as they connect the practice of our profession with science, and give a secure foundation for practical aphorisms, they are especially important.

There is another branch of the subject,—the peculiarities of the integuments of the head : 1st, As the brain is in sympathy with them ; 2dly, As they are influenced by the condition of the digestive organs ; *e. g.* being peculiarly subject to erysipelas ; to a reflected influence.

Take up the most approved medical author ; study the subject of idiopathic inflammation of the brain ; be able to describe the symptoms ; and on this foundation commence the surgical view. Now you are led to consider, *How does injury reach the brain ?*

Seeing that injury to the brain is our proper and limited subject, the brain is affected in two ways:

1. By concussion, that is, the vibration, from the blow, upon its delicate texture.

2. By inflammation, death, or caries of the skull, communicating inflammation to the membranes of the brain.

3. By fracture of the bone and its depression upon the brain.

Symptoms of concussion.—First degree—have you not experienced it?—as when you have struck your head against a post: flashing of light, pain, confusion, sickness, paleness, fainting, with singing of the ears.

Second degree, as when a horseman is pitched upon his head, and lies as if dead; insensible; limbs relaxed: hardly breathing; pulse weak, it may be intermitting; pupils for the most part contracted. He may be bleeding from the nose or ears; but that often accompanies fracture: his extremities become cold. To a man in this condition you may make a show of acting, such as the application of harmless stimulants and friction; but you perceive that the danger you will have to obviate is from inflammation: yet till the pulse rises you dare not bleed.

Inflammation, coming on during the insensibility of concussion, is marked by increased pulse; flushing of the face; restlessness; the warmth more diffused; he feels when pinched, but still is stupid.

[The injury to the brain is direct; *the symptoms immediate.* The analogies are a blow on the stomach; the concussion of a limb from machinery; a ball passing near the eye without touching it. The symptoms which follow are the effects of *reaction.*]

If the case be desperate, there follows deeper oppression.

[From effusion consequent on the excited state of the vessels.]

If he survives, and becomes sensible, he much resembles an intoxicated person. Sometimes he has a morose expression; the countenance and eye inflamed; contracted pupil; rapid pulse; convulsive motions; cord-like tension round the temples. (See further of the fracture with concussion.)

If he dies, the stages are,—concussion or direct vibration; reaction or inflammation; effusion and oppression.

Practice.—Bleeding (see, p. 8; cold lotions to the head; clysters; sinapisms to the feet. When he can swallow, purgatives, with calomel and antimony in combination.

The more *remote effects of concussion* are,—inflammatory deposit on the membranes of the brain; adhesion; abscess. To be counteracted by occasional evacuation, antimonials, blisters, setons, and alterative courses of mercury.

Concussion with Fracture.

If you have understood the nature of concussion, you will perceive that, in a certain degree, it must accompany all severe in-

juries of the head, and shocks to the general frame; and that fracture of the skull implies a certain vibration or concussion communicated to the substance of the brain. The mere fissure or breaking of the solid bone would be attended with no immediate symptoms, were it not that the force which breaks the bone reaches the brain.

[Sir B. Brodie says, concussion is a rare occurrence: so Abernethy,—the symptoms of fracture of the base of the skull resemble those of concussion. It would be very odd if they did not!]

Hence you perceive the confusion in the details of authors, for want of clear principles.

§ II. *Contusion of the Cranium*

1. *Contusion without open wound.* 2. *Contusion with open wound of the scalp.*

I said that the brain may be affected as a remote consequence of injury to the bone.

[This is the case so well described by Pott, with whose works you must be familiar. M. Quesnay, *Mem. de l'Acad. de Chirurg.*, understood the case; so did Le Dran; but the line of practice is laid down by Pott. An opinion prevailed that the danger arose from a species of counter fissure. (See *Counter Fissure*, p. 104;) and read the observations of Mr. John Bell. You may go further, and find *death from a slight blow* in Hildanus, Marchetti, and Scultetus.]

A small blow, as with a hazel stick used in cudgel playing, may irretrievably injure the bone; and its consequences are most formidable and insidious.

On the second or third week the patient feels unwell; looks ill; there is chillness (horripilatio;) languor, with some degree of fever; he is hot and thirsty; on the scalp there is a flat tender swelling.

Having heard the circumstances, and examined the patient, you must use your scalpel, and make an incision down to the bone. Now you have something to observe which is to direct you,—the pericranium is separated from the skull, and a fluid is interposed. If left open, the surface of the bone dries.

Now it is possible that the surface only of the bone is deadened: it may still granulate; or a scale may be thrown off. But whilst watching for the little red spot of organised lymph upon the surface of the bone, shiverings announce the formation of matter, the patient may be lost. In these circumstances the trephine is to be applied.

[The *rationale* is this. The blow has deadened the bone, the pericranium therefore separates from it. If the outer periosteum is thus thrown off, so may the internal periosteum (viz. dura mater;) and if so, there will be matter confined under it.]

Observe that, in such a case, though dissection shows pus on the dura mater, adhesion of the dura mater to the pia mater, and deep

abscess (vomica) in the brain, the symptoms are notwithstanding not the same as in "idiopathic inflammation" of the brain.

At first the skin is hot and the pulse quick; the face flushed; the eye languid; pain in the head, and lightness: he has shivering; he lies torpid; mutters and is restless in his sleep; gets up and wanders through the ward; is led to bed. He can be roused as from sleep; by-and-by he cannot; he has fallen into a deep comatose state, and expires.

Sometimes the inflammatory state is marked by more distinct symptoms. The fever is higher; the delirium violent before he falls torpid.

Contusion by Gunshot.

Having seen all these evil consequences from the scalp being bruised by the wadding of a pistol merely, I conceived (*à fortiori*) a ball striking the skull must do mischief. But much experience has shown that a musket ball may be flattened on the skull, and produce no one bad symptom. Nevertheless, in such a case, you must watch diligently and anxiously for symptoms.

The Skull injured by Contusion, and the Scalp laid down.

When this happens, the symptoms described may occur, and from the same cause. The outward sign will be the separation of the integuments from the surface of the bone, and the drying of the surface.

Erysipelas, by destroying the integument, and denuding the bone (especially in an elderly person,) may produce a similar train of effects.

§ III. *Compression of the Brain.*

It is here that the difficulty lies. In this we have the source of error, and of the discrepancies of authors. The student must approach it thus:

1. What is meant by compression of the brain? Is the brain compressible? No.

2. When the bone is intruded, or the blood extravasated, since the skull does not yield, What is the actual condition of the brain? The result of this inquiry will be, that, in proportion to the encroachment on the area of the brain-case, the blood circulating in the vessels will be diminished.

3. What is the consequence of the acceleration of the circulation through the brain? What of its retardation? What is the consequence of the diminution of the activity of vessels by the compression?

By such a process of reasoning we arrive at the conclusion, that

what is termed compression of the brain is a diminution of the calibre of the vessels within the cranium,—a diminution of the quantity of blood actually circulating; and the consequence, a diminution of all the cerebral functions,—insensibility, or profound sleep; an immovable and dilated pupil; the pulse labouring; the breathing heavy and stertorous.

With general compression there may be a derangement of the brain: *e. g.* if the bone be so far depressed by external force as to “compress the brain,” there must be at the same time a certain inequality of pressure. In the same way, if a vessel burst, the substance of the brain may be lacerated, and give rise to symptoms not necessarily arising from compression.

You will read that the insensibility of compression may continue an indefinite time—hours—weeks—months! If so, then are our premises and our course of reasoning altogether wrong. The explanation is in the following subdivision.

Insensibility from Irritation on the surface of the Brain.

There is a hiatus in all writers on wounds of the head. They take cognisance of no other cause of torpor than compression;¹ whereas irritation on the surface of the cerebrum will produce somnolency. It is this state of insensibility that may continue for an indefinite time.²

[¹ When a portion of dead bone is taken away by means of the trephine, and half a teaspoonful of matter is evacuated; and when, in these circumstances, the patient opens his eyes, is it consistent with a just mode of reasoning to say “we have taken off pressure.”

² For example, the famous case under Cline, where a spine of bone no longer than the prickle of a thorn, sticking through the dura mater, caused insensibility for months. The medical student will find analogies. Similar effects from irritation on nerves.]

Compression from Rupture of an Artery within the Dura Mater.

Here we have compression without concussion; and if the blood is effused in the substance without injury to the surface of the brain, the symptoms are not immediate: the patient will walk home; complain of sickness; vomit; take voluntarily to bed; and gradually there comes on deep coma.

[See a case in the second volume of *Anatomy* by *John Bell*. See a case by Sir B. Brodie, *Med. Chir. Trans.* xiv. p. 347. *M. Petit* first pointed out the importance of marking the distinction of symptoms, as arising immediately or remotely. See also *Quesnay*, *Mem. de l'Acad. de Chir.*]

Thus observe how things are jumbled together, viz. the consequences of concussion and compression; because the first class of

symptoms—the immediate effects—are very often, without interval, followed by those of compression. Observe further, that, in the brain (a part highly vascular, and susceptible of action), inflammation very soon arises, and adds to the intricacy of the symptoms.

[Thus a person standing by the side of a patient, and stating what he observes, convinces himself that he must be correct. But to be an observer requires a knowledge of principles, without which all is confusion.]

Thus a blow on the head, which fractures and depresses the bone, produces a condition in which the symptoms of concussion, compression, and inflammation, are combined.

§ IV. *Fracture of the Skull.*

You must make yourself master of the doctrine of counter fissure. It is an element in all reasoning on injuries to the skull—in all consultations.¹ Mere experience, however vaunted, and however necessary in our art, has failed to furnish correct views of practice in injuries of the skull. The subject must be studied by a process of reasoning or induction.

[¹ A bell being struck, it vibrates. The motion is a necessary accompaniment of the sound. Why as obvious a motion does not result from a blow on the calvaria you have to consider; as, for example, owing to its substance, its inequality of form, its tables, &c. But if it be proved that in some cases the skull is fractured at the point opposite to that struck, if on other occasions the rent is lateral to the direction of the blow, and still remote from the point struck, there must be a cause, and one that operates uniformly, and in every case of injury; although in some manifestly, in others with a hardly perceptible effect.]

Look to the skull; consider its texture and form. Is it possible to strike a part without affecting the whole? And why does it not ring like a glass at table? because the soft parts are in contact; because of its irregularities. It is exactly so; but if the soft parts resist the vibration, must they not on that account suffer? This leads to the consideration of the effect of the vibration—1. on the brain; 2. on the membranes in adhesion with the bones.

The facts, then, are these: a child receives with comparative impunity blows and falls which destroy an old man. In reflecting upon this, it is to be recollected that the texture of the brain of age is firmer and more subject to injury by vibration; the skull, too, has lost the elasticity of infancy and youth, and the vibration from the blow is more intense.

Fracture in Childhood.

For these reasons, and others still more to the purpose, the old and experienced surgeon does not trepan a child. In a young person the skull is thin, more elastic, and much less brittle; nay, it is

yielding. It is also a great deal more vascular, being in a state of growth; therefore, the vibration from the blow is less. If the bone be depressed, it is known actually to rise again after a time to the level! and if indented, even with fissure, the bone accommodates itself and lives. Besides, when you do trephine a child's skull, the bone adheres more to the dura mater, and you are in danger of injuring that membrane. If the dura mater be pierced in a child, *fungus cerebri* is very apt to rise.

Therefore, do not use the trephine to an infant, and avoid it by every means possible in youth.

In the adult the *diplœ* is formed. There are the two tables, the inner of which is dense and brittle. Study the results of this; *e. g.* if the bone be fractured and depressed, the *tabula vitrea* forming the edge towards the brain is sharp and jagged.

[Hence the pulsation of the brain, forcing up the membranes against it; they are inflamed, and ulcerate.]

Again, the inner table is broken off to a greater extent than the outer one; so that the edge, shelving under the edge of the hole in the skull, the broken piece cannot be lifted out.

[The trephine is therefore used. Often the bone can be raised to the level, but being deprived of *pericranium* on the outer surface, and shaken from the *dura mater*, it cannot live. Permitted to remain, it irritates and inflames the membranes. This is especially the case in old men. In children, the connection of the broken piece with the skull is often preserved, or with the *dura mater*, and consequently it lives. The living bone does not irritate as the dead bone does.]

Distinctions in Fracture of the Skull.

We distinguish—1. *Contusion*; 2. *Puncture*; 3. *Capillary fissure*; 4. *Fissure*; 5. *Fracture*; 6. *Fracture with depression*; 7. *Gunshot Fracture*.

These present real and important distinctions. Practitioners will sometimes consider these differences as accidents of no moment. They are of moment, as indicative of the nature of the force, and the effect of it on the brain.

Of *contusion*—see what has been said.

Of *puncture*—observe, that the point of a sword or pike, or the small end of a hammer penetrates the outer table, and breaks off a small splinter of the *tabula vitrea*, which penetrates to the brain.

A *capillary fissure*, apparently insignificant as an outward sign, is most formidable, because it has been caused by a blow that vibrates round the skull, and is attended with concussion, and all its formidable consequences. Often it is attended with blood under the temporal portion of the parietal bones.

Fracture with depression is a large subject.

Gunshot fracture is peculiar; inasmuch as the injury being inflicted by a body moving with great velocity, the fracture is often

comminuted, and without the stellated form of fracture from a large and heavier body.

[Any of all these fractures can be made on the skull of the dead subject by apportioning the instrument and the force. This shows the relation between the form or appearance of the wound, and the nature of the accident.]

Bleeding from the Ears.

Blood flowing from the nose and ears is a symptom attending fracture of the skull. It may be consequent on mere concussion, a vibration which ruptures the membranes; but oftener it is a consequence of fissure across the base. The temporal bone suffering, the ear is full of blood, and in very violent shocks the serum of the surface of the brain flows through the ear!

You perceive how rupture of vessels external to the brain is symptomatic of concussion, *i. e.* not consequent but concomitant.

§ V. *Counter Fissure.*

Surgeons puzzle themselves by not taking the few simple physical phenomena into consideration. Suppose you take a hoop; press it on one part, it bulges or is distended on the sides, and in consequence of this distention of its side, it is flattened on the point opposite to where it is pressed. Such is the momentary condition of a bell struck. If the reader will draw a circle, and over it an oval or or ellipse of the same area, he will be able to mark—1. the point pressed or struck; 1. the point immediately opposite, which is flattened; and, 3. the points lateral to the force, and which are spurred out.

Now, instead of a hoop or bell, take the calvaria. A weight falls on the sagittal suture; the temporal angle of the parietal bone (perhaps on both sides) is broken or started, and separated from the dura mater beneath. Is there any thing more simple? Can there be any consideration more important as illustrative of the most common occurrences?

The next step of the inquiry is this: An old man falling on the carpet, or on soft ground, does not suffer fracture on the part of the skull which touches the ground, but on the point diametrically opposite. This does happen undoubtedly;¹ but why it does not oftener happen must be obvious,—the temples, *i. e.* the lateral points of the circle, are thinner, flatter, weaker; and by their yielding the vibration is stopped, and does not reach the point opposite.

[¹ The most distinct case I have met with, was where a heavy square bucket, fell upon the os frontis, a little to one side, and the fissure was on the temporal and occipital bone behind the opposite ear.

The fracture of the base of the skull is very frequent by reason of its inequalities; for though its form, like the groining of vaults, is

strong to bear weight, it is not in the same degree capable of resisting vibration.

When a man falls, the vertex meeting the ground, there are two forces meeting in the base; 1. the vibration running round the skull; 2. the impingement of the spine bearing the weight of the body, and forced against the condyles of the occipital bone; hence the frequent recurrence of fractures in the base of the skull.]

Blood frequent under the Angle of the Parietal Bone.

From these principles we perceive how coagula are so frequent in the temples. The common explanation is, that the meningeal artery is there—that it is ruptured—and that the force of the artery tears up the dura mater from the bone.

In some rare cases the artery is torn.¹ But it is not of size and power enough to tear up the connection between the dura mater and bone, unless the membrane has been shaken by the reverberation which tore it.²

[¹ We find a thick coagulum and the artery torn, and the dura mater depressed from the bone, and the brain exhibiting a corresponding depression. But we find on other occasions the dura mater separated at both temples, and the blood effused from small vessels. Besides, my experiments on the dead body show that the dura mater is separated under the angle of the parietal bone, where there can be no action of the artery to tear it up, but only the starting of the bone from the effects of the blow on the vertex or occiput.

² Accordingly, Abernethy had an hypothesis that the compression of an artery excited it to extraordinary activity. There is no ground for such a belief.]

We perceive how mistakes regarding the case of extravasation arise. The blood being effused in consequence of the shock running round the skull, the brain suffers from the propagation of the tremor at the same time inward. Hence are combined the symptoms of concussion with the existence of coagulum, and hence the greatest confusion of symptoms!

Hence, too, it happens that, although we use the trephine and take away the coagulum, the cause of pressure, the symptoms continue; showing that they have been those of concussion and its consequences. And again, we perceive how it happens that patients seldom recover from great coagulum of blood under the skull; the extent of extravasation being the mark of the severity of concussion.

Lastly, we see a reason why the rent or fissure tends to the temples.

§ VI. *Cases which require the use of the Trephine.*

1. The trephine is used (and with a large head) when, from
2—b 9 bell

contusion or other causes, the bone is dead, and there is matter under it.

2. It is used to relieve the pressure from coagulum between the skull and dura mater.

3. It is used to enable the surgeon to place his lever under the edge of the depressed bone.

4. It is used to enable the surgeon to withdraw the shelving edge of the depressed bone from under the firm part of the skull.

Operation of Trephine.

[The *instruments* are, a proper trepanning case; two levers; a punch as for the teeth; three trephines of different sizes, and adapted to one handle; a small saw; forceps adapted to the circle of the trephine; the lenticular: a brush; quill; flat probe.]

1. Do not bruise the integuments, and in your incision consider how the flap is to lie, and the matter of suppuration to be drained off.

[Many times, when all else goes right, erysipelas destroys the patient.]

2. Spare the pericranium. Consider that the dura mater is probably shaken from the lower surface of the bone, and that if you scrape off the outward periosteum you deprive the bone of nourishment.

[In which case the bone necessarily dies, and becomes a source of irritation. Thus the patient having escaped many dangers, has an open wound for many months during the tedious process of exfoliation of a large portion of the skull.

3. Is the circle of the trephine to be placed on the sound or the depressed bone? Authors tell you, on the former.

The subject requires some consideration. Suppose that there is a triangular portion depressed at the angle, with only a fissure at its base, which is on a level with the skull, and still firm. In this case, if you apply the trephine on the sound bone, near the angle, observe these consequences: 1. on cutting through the outer table, you come to press and jar against the depressed bone, and may force it against the dura mater and brain; 2. having taken away the circular portion, and having introduced the lever under the depressed portion, you find that you can raise it to the level only; its shelving edge is still beneath the skull, and its diameter greater than the hole in the skull!

In these circumstances, you would require to trepan on three sides, and to make a very large gap.

These are the reasons why I advise the centre pin of the trephine to be applied on the edge of the sound bone, close to the fissure of the base of the triangular portion. The effect will be, that the depressed portion will be made loose all round, and can be drawn from under the margin of the hole into which it has been depressed.

The Saw

Is used when, in consequence of the application of the trephine or the original form of the fracture, there stands out an angle of bone. In that case, by insinuating the spatula under it, you can saw across the portion, and avoid those abrupt angles which are a necessary effect of the circular saw.

Sometimes you will perceive that, by using the saw, you loosen the fractured piece, and are enabled to remove it without using the trephine, and to the effect of making a smaller opening in the skull.

Precautions in using the Trephine.

1. Have the centre pin projecting no longer than till the circle has cut into the bone to a depth sufficient to retain it there.

[I have seen a deep hole in the centre of the dura mater produced by neglecting this very obvious rule. When the centre is kept in too long it retards the operation.]

2. Consider the age of the patient, and the part of the skull on which you are operating.

[Would you expect two tables in a child? Would you expect the soft and bloody sawings of the medullium in a very old man?]

3. It will inevitably happen that the lower part of the circle is cut through before the upper, unless you are on your guard.

4. Withdraw the trephine from time to time, brush it, and run the flat probe round the circular cut. You will feel and distinguish the dura mater by its yielding; a sort of elasticity distinguishes it from the bone.

[Common sense dictates that, as you now proceed, you press more upon the opposite part of the circle. Observe then a defect in the instrument not uncommon; the teeth of the trephine are not set, so as to cut a larger hole than the diameter of the cylindrical part of the instrument. Consequently, in cutting through a thick skull, the instrument is so exactly fitted to the hole it makes, that you cannot incline the instrument, and consequently you are forced to go directly through the bone,—thus endangering the dura mater!]

5. Do not trust to the softness of the filings as indicative of diplœ, nor to the blood. In the case of contusion or death of bone, there is no blood.

6. If you operate for a diseased or contused bone, you will probably have fetor on perforating to the diplœ. You smell to the trephine when it is withdrawn. The occurrence evinces the necessity of the operation.

7. Proceed boldly at first, gently and slowly at last; taking care to cut regularly and without injuring the dura mater, to leave the

thinnest possible scale of bone before you break up the circular portion of bone.

The circular portion of bone cut by the trephine is broken up by introducing the lever first on one side, then on another, so as to unfix it, and taking two levers, one on each side, you *prize up* the portion cut. You use the *forceps* for the same purpose.

Raising the Depressed Portion.

Great injury is done by using one elevator; for by this you raise one side and depress the other, thereby injuring the dura mater. To guard against this, you endeavour to fix the edge by means of one lever, whilst you poise up with the other.

By picking off the lesser portions of fractured bone, you loosen the larger portion, and perhaps render the use of the trephine unnecessary. If, however, you think there will be finally a necessity for using the trephine, do not loosen the bone by picking away the lesser portions before you have made the perforation.

The use of the *lenticular* is to smooth the edge against which the rising dura mater presses, by introducing it under the edge of the rough bone.

Dressing.

The mildest dressing is to be used; lint dipped in oil put in contact with the dura mater,¹ and over it layers of the same, so that the compress and roller may be applied in such a manner as to give gentle and equable compression to the whole.²

[They say, lay down the integument on the dura mater; it is the best dressing. But this can seldom be accomplished.

²The object of dressing is to support the dura mater, and to prevent it from rising against the edge of the bone. If it presses there it is soon ulcerated, and then you see fungus rising.

It is especially necessary to guard the dura mater during a fit of coughing. The patient should be raised up on renewing the dressings.

Every thing should be attempted to assuage a violent paroxysm of delirium, for then the brain is forced up, and the dura mater pressed against the bone.]

The "handkerchief," or the double-headed roller retains the dressings. Let the patient be laid with his head high.

Fungus or Hernia Cerebri.

When the dura mater is torn by the depressed bone, or when it is ulcerated by being thrust up against the sharp edge, we have to dread lest a portion of the brain be thrust through, or a fungus rise up.

[A tablespoonful of brain has been forced out in a fit of coughing. The tumour is in part brain, in part a rapid growth, owing to the extreme vascularity of the brain. It will rise in a night to the size of an orange, if unresisted.]

This tumour is a consequence of a force from within. The pulsation of the arteries of the brain, and the occasional impulse carried backwards along the column of the veins causes it.

[There is, independently of the hernia cerebri, an injury *from within*. The opening of the skull and dura mater permits the pressure from within to be concentrated towards the unsupported part of the brain. Hence the brain on dissection exhibits numerous spots of extravasation.]

To guard against it, you must support the dura mater.

When it has taken place, you employ pressure to restrain it, yet not forcibly to push it back.

As it is often combined with suppuration, care must be taken to permit the discharge from under it. It is too often a fatal occurrence.

§ VII. *Treatment of the Injured Integuments of the Head.*

In contusion of the integuments of the head without open wound, there is a deceptive feeling as if the bone was fractured and depressed.

If the scalp be cut from the bone, as by a sword, or if it be torn, it is to be laid down in the hope that it will adhere.

If it be cut down, and the surface bruised by a bludgeon, still it is to be laid down on the bone, although being bruised, the probability of adhesion is diminished.

If the scalp be torn down, as by a cart-wheel passing obliquely over the head, and if the dirt be kneaded into it, it is better to poultice and wait for granulation.

[Some say the scalp is to be laid down, as it can do no harm; if it does not adhere we are no worse off. This is a mistake, for you do not know that it is not adhering until symptoms arise, and on introducing the probe under the flap, the bone is felt bare.]

Do not on any occasion use needle and ligature to the scalp.

A punctured wound of the scalp (and a needle makes such a wound) is very apt to produce erysipelas.

The object of treatment in injuries of the integuments must be to subdue phlegmonous inflammation that it does not extend to the meninges; and therefore bleeding, cold lotion, purging, and nauseating doses of antimonials are necessary.

Another danger is the erysipelatos inflammation. It renders the wound formidable by causing sloughing, which leaves the bone bare.

In this case, tepid fomentation, with infusion of conium, may be applied over the dressings; and nauseating doses of antimonials

administered, and the bowels relieved by small repeated doses of the sulphate and carbonate of magnesia in the form of draughts.

Let my last advice be, that you deliberate well before trepanning the skull. Never forget that you are inflicting a dangerous wound. The oldest and the most experienced surgeons are the least prone to have recourse to it.

CHAPTER XVII.

DISLOCATIONS.¹

Dislocation is the displacement of the bones at their articulating processes. These are the accidents which most try the abilities of the surgeon. We distinguish—

1. Dislocation; 2. Subluxation; 3. Diastasis; 4. Compound dislocation; 5. Dislocation with fracture. These mark the extent of injury. Then there is a distinction, as the displacement is a consequence of violence, or of disease and relaxation. We have also consecutive dislocation, and we may fill the list with congenital dislocation.

[Some of these distinctions may require a word in explanation. *Diastasis*: In this case it happens that the bones are displaced, but fall again into their place; seemingly nothing is wrong, yet the injury is great, by rupture of ligaments, &c.

Consecutive dislocation happens in consequence of the original injury causing inflammation of the joint, a new position of the bones, and perhaps a filling up of the articulating cavity.

Dislocation from Disease.—When disease relaxes the ligaments, and pours out effusion into the joint, as, for example, in the knee-joint when the patella is put out; or when disease in the shoulder-joint attended with relaxation, permits the muscles to draw off the head of the humerus.

Congenital Dislocation.—Thus I have seen the two hip-joints play in and out, being imperfect from birth.]

¹ There are certain subjects of previous study; the nature of the cellular membrane; of fascia; ligaments; the structure of joints; the nature of cartilage; the changes to which they are subject. Thus the student of surgery must diligently and repeatedly dissect the tendons and ligaments which surround the joints, reflecting, the while, on the different directions in which they may be sprained or torn.

Peruse diligently Sir Astley Cooper's work on Dislocation, and trust implicitly to what he delivers: a seemingly poor praise, yet how seldom to be bestowed!

General Marks of Dislocation.

These are—pain and inability to move the joint when there has been no direct injury to the part; a check in the motion of the joint; unnatural direction of the bone; loss of convexity in the articulation; the head of the bone felt protuberant, or filling up a space unnaturally; rigidity of muscles from displacement of their tendons; and numbness from pressure on the nerves by the displaced bone, and the interruption to the pulse from the same cause.

In common cases of dislocation, there may be said to be two forces in action: 1. The external violence; 2. The muscular retraction when the surfaces of the bones are no longer in opposition.

[It is this displacement by the action of the muscles which draws the head of the bone into a position where it is checked, and with difficulty withdrawn.]

In dislocation, the capsular ligament and synovial membrane is either partially or entirely torn. The tendons also suffer from the displacement of their sheaths and groove, and are sprained or torn. The muscles are frequently torn, and with extravasation of blood.

If the bones remain unreduced, then new adhesions are formed; in some cases new sockets for the head of the bone, the original one becoming less perfect; and, owing to the new position of the bone, certain muscles are thrown out of action, and waste.

[Insomuch that in the attempt to reduce old dislocation these muscles are torn.]

There are three forces to be employed. Let the *extension* be made by applying the laques or apparatus to the bone dislocated, not to those more distant from the joint. The *counter extension* means merely the resistance made by fixing the trunk or the bone from which the other is separated. The *lateral elevation* is of much importance, viz. the drawing of the limb laterally, or the affording a fulcrum which will enable you to raise the head of the dislocated bone over the edge of the socket.

Causes of Resistance to the Reduction of Dislocation.

These are, first, the new position of the ligaments, which now maintain the bones in their new positions, locking their heads together.¹ The muscles certainly resist, and resist the more, the longer the reduction is delayed; but this may always be overcome.²

[¹ Too much of the difficulty is ascribed to the muscles. Is there any instance of difficulty greater than in the dislocation of the thumb? See also dislocation of the shoulder.

² And the best and safest way is by long continued extension before the effort is made. Bleeding is used, inducing sickness,—the warm bath.]

In the operation the difficulty for the most part is in fixing the trunk of the body ; great care must be taken to guard the arteries and nerves.

[I have observed complete paralysis of the limb from injury to the nerves by the laques. Let the surgeon calculate the power of the compound pulley before using it, or he may do irrecoverable injury.]

We are apt to neglect the means of subduing inflammation after the reduction, not considering the violence which has been done ; hence rheumatic inflammation and permanent weakness of the joint.

A question will arise, should an old dislocation be reduced, and after what time ? Sir Astley Cooper says the attempt should not be made in the dislocation of the shoulder after three months, nor of the hip after eight weeks.

[A mistake prevails. These old dislocations are not to be *reduced* in the manner of a recent displacement ; for then there is great violence done, even to the rupture of muscles or of the artery, and injury to the nerves. The mode is not by one attempt, but by a repeated—daily—often repeated and more gentle elongation of the adhesions. When you have succeeded, for example, in completely loosening the connections of the head of the humerus, you may attempt to return it into its original place. In these cases, you have nature favourable to your efforts. See a paper by a surgeon of Rouen, in the *Repertoire Generale d'Anatomie*, for all the mischiefs that may arise from attempts at long delayed reduction.

CHAPTER XVIII.

INJURIES TO THE HIP-JOINT.

This a subject of great practical interest.¹ Inflammation of the hip-joint causes a change in the position of the pelvis, and an apparent shortening of the limb ; and let it be particularly noticed that the joint being hurt, it slowly degenerates in a very remarkable manner, producing a complete change in the form of the head and cervix.² The head expands, the cervix is absorbed, and the trochanters approach the brim of the acetabulum, so as to check the motion. The muscles of the hip waste, and the bones project unnaturally.

[¹ Sciatic and nervous pains, rheumatic and gouty inflammation of the hip, and the secondary effect of injuries, give frequent rise to consultation.

² Unless the surgeon be familiar with the objects in a pathological museum, he will not easily believe how strangely the head of the

bone may be disfigured. From inattention to this has arisen much of the question about fracture of the neck of the bone. However, let this be remembered, that a man receiving a severe injury on the hip (for example, being thrown from a coach), the surgeon examines him, and finds all in its place, and neither dislocation nor fracture: months having passed, and the patient being lame, the hip is examined, and it is declared to be an ill-treated fracture, or a neglected dislocation! The second opinion arises in ignorance; and the first surgeon consulted is not to blame.]

Dislocation of the Hip-Joint.

The most common dislocation is where the head of the femur lies upon the dorsum of the ilium. The next in frequency is when the head of the bone lies on the *foramen ovale*. It may be dislocated forward on the pubis.

[In the incalculable variety in the direction of the force dislocating and of the position of the bone, there is hardly a direction in which the thigh-bone may not be wrenched or dislocated. 1. The head on the *dorsum ilii*; 2. On the thyroid ligament; 3. Into the ischiatic notch; 4. Upon the body of the pubis. The general principles, with a knowledge of anatomy, will serve to direct the surgeon in all these cases. But in the text I limit myself to two of the common occurrences, which the reader would do well to study.]

Inquire into the nature of the accident—the direction of the violence. He has fallen sideways; the foot entangled, he has come upon his hip.¹ In that case, being dislocated, you may expect that the limb shall be shorter; in some measure locked, with the knee turned inwards and the heel outwards. It is then a dislocation on the ilium.²

[¹ One is plagued thus: when you observe that the limb is shorter, the patient cries out, “O, sir, it was always so!” The fact turns out to be, that he having an old diseased hip-joint, has fallen and sprained it. In the case of an old disease of the hip, the pitch of the pelvis is very apt to deceive us, by giving the appearance of a shortness of the limb. Then see that the neck or trochanter be not fractured, which by-the-by is not likely in a young or athletic person. In fracture the limb is more loose; can be extended, and even bent, though with pain, and the whole position is different. See Fracture.

² The shortness of the limb is in that degree that the toe of the dislocated limb rests on the dorsum of the other foot.]

Previous to the operation, I do not object to the use of the warm bath; but I cannot think of punishing the unhappy patient by administering the tartarized antimony.

Reduction.

[In hospitals, there should be a ring fixed in the wall of the accident ward; another sunk in the floor; to the first, the apparatus for fixing the trunk should be attached; to the other, the hook of the pulley.]

Lay the mattress on the floor, and the patient extended upon it, inclining to the opposite side. First contrive to secure the pelvis. There is a long and broad strap, well padded, and having strong rings at the ends; this is put between the thighs, and brought round upon the groin before, and the hip behind, to the side of the body, and fixed with ropes to the wall. Let the perineum be well defended with tow, and the scrotum put aside. Roll the lower part of the thigh with a wet bandage; bend the knee-joint, and apply the proper belt,¹ so that it holds on the knee above the condyles. Carefully defend the artery and nerves in the ham with tow. Let the surgeon hold down the pelvis, and with the other hand feel the trochanter, and let him mark the change in the position of that process as the assistants pull.

[¹ This band consists of a strong leather belt, quilted or padded on the inside, with straps, and buckles on the outside. It has two iron hooks, to which the cords and pulley are to be attached. Wet towels are the substitute in private practice.]

The tackle being applied, the cords are for some time kept tight; then gradually the force is increased. An assistant in the mean time uses the leg as a lever, by carrying the foot across the other leg. He will assist in lifting the head of the femur from the dorsum of the ilium,—by rotating the limb inward, and the cord of the pulley being gradually and steadily pulled. The surgeon feels and hears a snap as the head of the bone falls into its socket.

The whole apparatus being relaxed, the patient is aware that the bone is reduced. The surgeon compares the points of the anatomy and is satisfied.

[It may occasionally be necessary to put a towel round the thigh, close up to the perineum, and to draw the head of the bone outward, which facilitates its rising over the brim of the acetabulum; or it operates as a fulcrum when the knee is carried inwards.]

Dislocation into the Thyroid Hole.

The accident, that is, the force acting to produce this dislocation, is different. Suppose a man unloading a cart, and he unexpectedly receives a heavy sack on his loins and the side of the pelvis; he is forced down, the extremity being stretched outward, and backwards. Thus the lower part of the capsule is burst, and the head of the femur thrust downwards and forwards; and so lodges on the obturator muscle and thyroid membrane.

[The accident also happens by the foot slipping, so as to straddle the thighs asunder.]

The marks of this dislocation are less distinct than in the former case. The limb is longer than the other. The trochanter is sunk, and the patient keeps his body bent forwards, or the thigh raised.¹ There is a hollow in the groin. The knees cannot be brought together without pain. The head of the bone is obscurely felt in its new position.

[¹ On account of the insertions of the psoas and iliacus internus muscles being carried with the lesser trochanter in its new position.]

The reduction is to be attempted without the use of the pulley. The thigh is to be drawn in the direction in which it is found, and then the knee is to be carried in adduction, or towards the other knee; whilst the towel put round the thigh close up to the perineum, serves as a fulcrum, by which the head of the femur is lifted into its place.

Dislocation into the Ischiatic Notch.

[The signs are not so distinct as when the head of the femur is on the dorsum of the ilium. The length of the limb is nearly natural. The knee is still in a degree turned inwards. The rotation is checked.]

In this case the extension of the thigh should be made in a direction across the other thigh. The prominence between the place in which the head of the bone lodges and the acetabulum, is higher than in any other kind of dislocation, so that here especially we require a fulcrum, by carrying the towel on the inside of the thigh, close under the perineum; and to draw outward, whilst the thigh is elongated and carried obliquely across the other thigh. The reduction is difficult.

[We must have our minds directed to the possibility of fracture of the acetabulum in examining a case of dislocation of the hip. When the acetabulum is split, the head of the femur is drawn up and the leg is shortened. The ease with which the bone is drawn down and moved in different directions, will save you from committing the mistake of applying laques to reduce a dislocation.]

Dislocation of the Patella.

The knee-pan is most frequently dislocated to the outside. It may be struck in falling, so that it escapes like a wedge struck with a hammer, and lodges on the inside.

[In persons who are in-kneed, the violent action of the quadriceps muscle may dislocate the bone without the knee touching the ground.]

The reduction is made by extending the leg; raising the whole extremity so as to relax the rectus muscle; then pressing down the

edge of the patella, so as to raise that which is towards the joint, that it may start over the condyle.

But if it be difficult to reduce thus, then the patella is to be pressed downwards; that is, towards the space between the condyle and the tibia; as it were by a circuitous way, to surmount the prominence of the condyle.

[By the displacement of the knee from the synovial membrane, a part of the capsule must be torn, and there is effusion in the joint, for which the patient must be treated.]

In examining the joint under the belief that the bone is dislocated, you will recollect that the same force may produce a very different effect,—the rupture of the tendon where it is inserted into the upper edge of the patella; or there may be a rupture of the ligament of the patella.

It would be an affront to an anatomist to give him the signs of dislocation of the tibia from the lower head of the femur; only let him not despair on account of the formidable nature of the accident. By attention to keep down inflammation, recovery may be expected.

The lesser injuries by sprains are perhaps of more consequence to the practitioner; they turn out so ill if neglected. For example:

Injury to the Internal Lateral Ligament.

An old lady stepping from her carriage, or coming down stairs, sprains the inside of the knee. This must be cared for; the inflammation kept down; and the knee supported against a repetition of this injury.

[The width of the pelvis and obliquity of the femur is the cause of the accident happening to women. The weight of the body acting through the oblique thigh-bone bears on the inner lateral ligament, and sprains or ruptures it.

A ligament thus injured inflames and is relaxed, or loses its firm texture. The knee by this means inclines inwards; the obliquity of the thigh is increased; the patient suffers a second and a third wrench, and becomes permanently lame.]

The semilunar cartilages are subject to displacement. The accident appears to happen in those who have weakness in the joint, and by a slight degree of force. The method of reduction recommended by Mr. Key is to bend the knee to the utmost, and then straighten it; by which, it is presumed, the displaced cartilages adjust themselves again to the convexities of the condyles.

[Were it not that we have the authority of the two best surgeons of our time, Sir Astley Cooper and Mr. Key, to the frequent occurrence of this accident, I should be inclined to believe, that loose cartilages in the knee-joint have produced effects attributed to the displacement of the semilunar cartilages.

Compound Dislocation of the Knee.

'This is a case for amputation.

Dislocation of the Ankle.

Your patient tells you, that his foot being entangled, he fell to that side ; or he has stepped down unexpectedly ; or dropped upon unequal ground, which twisted the foot outwards.

The strain is upon the deltoid ligament ; it is lacerated, and the internal malleolus starts off the astragalus. You recognise the partial dislocation by the prominence of the inner ankle and the twisted position of the foot, the eversion of the sole.

[See Fracture of the Fibula.]

In reducing it, you relax the muscles by bending the knee and pointing the foot. The leg being held, the surgeon takes hold of the heel and the fore-part of the foot. The parts being adjusted, lay the leg on the outside and on the proper splint, having a foot-piece, the knee being bent.

[You will have much difficulty in preserving the bones in their place, and a splint may be required on both sides.]

A person stepping down a flight of stairs, the heel striking the edge of the step ; or stepping down on the yielding step of a carriage, may dislocate the bones of the leg forwards off the astragalus. The heel projects, the toes are pointed, the foot apparently shortened, the tibia projects on the tarsus, and there is an unusual hollow between the tendo Achillis and the tibia.

[When the dislocation is complete, the tibia rests on the navicular.]

Let the assistant raise the thigh and hold fast ; the leg being in a position to relax the tendo Achillis. The surgeon's hands are upon the heel and the fore-part of the foot.

Sometimes the luxation is partial, the fibula broken, and the malleolus internus projecting forwards.

In compound dislocation inwards, the astragalus is sometimes displaced, and so projecting as to require to be taken away altogether ! The case is desperate, yet it may do well, as in the following case.

[In taking out the astragalus, Mr. Shaw says, that the chief difficulty which he experienced, in the case of F. Moore (Med. Gaz. July, 1837.) was to get the point of the knife introduced into the ankle-joint, so as to cut the capsular ligament from within, along its attachment to the astragalus. Although the astragalus was displaced from its connection with the os calcis and navicular, yet it retained its relation to the tibia and fibula ; and from the inner malleolus overlapping the side of the astragalus, the interior of the ankle-joint could not be laid open, so as to cut from within the joint. He was therefore obliged to saw through the astragalus, by

which the bone was turned in its socket, and an open space was obtained between the surfaces of the ankle-joint; when the operation was readily completed. He was restricted in his incisions by the necessity of avoiding the anterior and posterior tibial arteries, which both ran close to the astragalus.

It is unnecessary to describe the manner in which the ankle-joint is dislocated outwards, or how the astragalus and external malleolus are broken. The knowledge of structure makes the nature of the accident and the mode of replacement sufficiently obvious.

[The injury, when the foot is wrenched under a carriage-wheel, will present very great variety; but the practical distinction will turn on the degree of injury to the soft parts. Generally speaking, the ankle having suffered compound dislocation, by the wheel passing over the joint, is a case for amputation; the injury being much greater than in dislocation described above. After all, much will depend on the constitution of the patient. As in compound fracture you endeavour to close the external wound,—reducing the case to a simple dislocation. You must in the attempt to save the foot watch diligently night and day, using iced water and all the other means of preventing inflammation.]

Dislocation of the Ribs.

The extremities of the ribs start from their connections in consequence of bruises, which squeeze the chest.

[The most extraordinary instance which I have seen was that of a man who got between the wall and the lever of a horse-mill. The sternum and its cartilages were separated from the extremities of the ribs, yet he lived.]

You try by expansion of the chest, and by pressure on the started extremity, to replace it. You are under the necessity of treating it as a fractured rib.

Separation of Bones of the Pelvis.

The bones of the pelvis are subject to disease, which separates them. They may be separated by violence, too often combined with fracture: but nothing can be done but by swathing the hips and loins.

The os coccygis may be dislocated. The patient has slipped backwards, and hit a projecting point or a prominent stone or angle. The rectum is pressed upon, the muscles of the perineum are disturbed in their functions. To reduce the bone, place the patient on his knees and elbows; introduce the finger in ano, so as to push the bone outwards, and direct it by the fingers of the other hand externally.

[The injury or sprain of the ligaments of this bone is not unfrequent, and the consequences are very distressing. The patient cannot sit; or in attempting it the part is hurt again, and inflam-

mation kept up with great pain, as well as disturbance of the functions of the rectum and bladder. You must contrive pads, upon which the patient can sit without pressing on the extremity of the bone.

DISLOCATION OF THE UPPER EXTREMITY.

The scapula itself may be in a manner displaced. When a person falling backwards puts out his hand behind him, the scapula glides so far back, that the lower angle slips over the edge of the latissimus dorsi. It will be reduced by forcing back the arm, and pressing down the angle of the scapula upon the ribs.

[It more frequently happens, however, that the edge of the muscle is bruised against the scapula, and an ecchymosis takes place; the patient giving his surgeon an assurance that he struck nothing, and did not come to the ground at all!]

Dislocation of the Clavicle.

The case which most frequently occurs is a sprain of the joint of the clavicle with the sternum; producing strumous inflammation in and around the joint.

[Besides attention to the scrofulous disposition and covering the joint with stimulating plaster, you must fix the arm so as to give rest to the parts inflamed.]

The clavicle may be dislocated; although the weakness of the bone generally prevents it, by yielding to that force which would otherwise wrench the joint.

The farther, or acromial extremity of the clavicle is oftener dislocated, in consequence of a person falling on the shoulder.

[See that you do not mistake it for dislocation of the humerus. The accident (that is, the force applied) is very different.]

The treatment is on the same principle with that of fracture of the clavicle,—to push the shoulder from the trunk, and to brace back the shoulders, and to support the arm so as to prevent the scapula falling low.

[The best apparatus is that of Sir Astley Cooper, which is in the shops. It will be found a great comfort to the patient.]

Dislocation of the Humerus at the Shoulder.¹

You will learn from the patient that he did not fall on the shoulder, the accident being a consequence of the extended arm acting like a powerful lever on the connections of the bones, bursting up the joint; when the muscles displace the head of the humerus.

¹ The reader should study this subject, in all its bearings, on the dead body.

[Thus some of our first authorities attribute the dislocation into the axilla, to the circumstance of the capsular ligament being weak in that direction! This is a lame account of the matter. The cause is the raising of the extended arm suddenly and violently, by which the head of the humerus comes in contact with the acromion. The acromion is the fulcrum to the long lever, and the consequence is, the bursting up of the capsule below.]

These are the signs of the humerus dislocated from the glenoid cavity of the scapula: 1. pain in motion; 2. the hand cannot be raised to the head; 3. the elbow cannot be pressed to the side without pain; 4. there is a flatness on the prominence of the shoulder; 5. perhaps the pulse is interrupted and the sensations of the arm numbed; 6. the arm is bent at the elbow, and to stretch the arm gives pain. Place the patient with his back towards you, and you will perceive that the shoulder has fallen, that the acromion is sharp and prominent, and that the insertion of the deltoid muscles takes an unusual angle with the humerus.

[Observing these marks, and putting your hands to the shoulder, you raise the arm and press the fingers into the arm-pit, when you feel the head of the humerus. The pain from extension of the arm is owing to the long head of the biceps muscle retaining its hold on the edge of the glenoid cavity, whilst it is carried away in the groove of the humerus.]

To reduce this dislocation, place the patient on a chair; pass a sheet under his arm and across his chest; give it to strong assistants, who are to hold him up against your efforts. Let a more intelligent assistant hold down the shoulder, pressing upon the acromion. Take a wet towel, and throwing it into the form of the proper noose, introduce the arm into it, so that it comes above the condyles of the humerus; there draw the noose and fix it.

If you require assistants, you attach a cord to the towel, and ordering them to draw steadily, slowly, and with a gradually increasing force; the arm is to be carried horizontally. You take hold of the arm at the elbow, and bending it there you rotate the bone. When you think the head of the humerus is sufficiently drawn from the axilla, and has reached the edge of the glenoid cavity, you put the fleshy part of your arm under the bone, close up to the axilla, and suddenly depress the patient's arm, when the head of the bone slips into its place.

[In many instances you can do this, and reduce the arm without assistance. But, often, it is to be acknowledged, the surgeon is baffled in his attempt. To what is owing this great difficulty? In my opinion, solely to the remaining ligamentous connections binding the head of the humerus under the neck of the scapula; and to relieve it, the arm must be raised higher than the horizontal position. In fact this is done in most cases of reduction; for the assistants who draw the arm overpowering those who sustain the body, the patient gradually more and more leans to the side; so that, although the arm be still drawn horizontally, the increasing

obliquity of the trunk becomes equivalent to the raising of the arm.]

When there is much resistance, do not be satisfied with pulling the arm directly out from the side. Carry it first across the chest, and then up to the face.

[By this manœuvre the coracoid process of the scapula becomes a fulcrum to the humerus, by which the head is lifted over the edge of the glenoid cavity.]

The mode of reduction with the heel in the axilla is very rude, but it must be done in remote situations, where you have neither assistants nor apparatus. Lay the patient on his back; throw off your boot; take him by the hand; place your heel in the arm-pit; draw upon the arm for some time; then throw yourself across his body obliquely, swinging by his arm. I have not failed in this mode of operating; still it is not to be done unless other means have been tried.

[The head of the humerus may lie forward under the pectoralis major. In this case the dislocation is easily distinguished; the elbow stands outwards and backwards.]

In all cases of dislocation the head of the humerus is to be brought out of its remote place into the situation under the glenoid cavity, and finally reduced by the means described above.

The dislocation of the head of the humerus upon the dorsum scapulæ is very rare. Anatomy, and the just application of principles, suffice to direct the surgeon in all these cases.

Attend to high fracture and diastasis of the apophysis of the humerus, p. 76, p. 66.]

Dislocation of the Elbow-Joint.

The accident is most apt to take place in young persons, before the coronoid process has acquired its full form and strength. The person falls forward on the hands; and the ulna, carrying the radius with it, slips off the trochlea. The projection of the olecranon declares the nature of the accident.

Reduction.—The surgeon places his knee anterior to the elbow-joint, and bends the joint over it. The sides of the knee are like two fulcra, acting both on the humerus and on the bones of the fore-arm.

[The difficulty is to raise the point of the coronoid process out of the posterior fossa, and at the same time to extend the arm. The intelligent surgeon will find means of varying the mode of reduction.]

The bones of the fore-arm may be dislocated laterally. In this case the olecranon is projected backwards, and the head of the radius is felt behind, and to the outside of the external condyle. The reduction is to be performed as in the more common case of dislocation.

The head of the radius is dislocated from the sigmoid surface

of the ulna. It lies before the humerus. The dislocation is ascertained by the sudden interruption to the bending of the arm, in consequence of the head of the radius striking the fore part of the humerus. The reduction is made by extending the hand (which is directly connected with the radius), drawing it downwards, and at the same time in supination; and when this is done, binding the arm at the elbow will preserve the radius in its place.

Dislocation of the Wrist-Joint.

Notwithstanding its exposed situation and complex structure, the dislocation of the wrist-joint is rare. When it happens, the knowledge of the bones and ligaments, and the general rules, are sufficient to the practice of the surgeon. The radius is dislocated from the lesser head of the ulna.

[The saciform ligament of the ulna is torn; the head of that bone is protuberant on the back of the wrist. When reduced, splints and a roller are necessary to keep the radius and ulna in their due relations.]

Dislocation of the Bones of the Hand and Foot.

I must not deny the possibility of dislocation of the bones of the carpus. They are of the form of wedges, and by lateral pressure may be made to start.

[But it is of more practical benefit to know, that an inflamed and thickened state of the ligamentous covering of these bones deceives the surgeon into the belief that the bone is displaced. He is attempting to force a bone into its place, when he should be employed in soothing an inflammation of the periosteum or ligament. "Ganglia are mistaken for this accident." Yes! So says Sir Astley Cooper; but do not take his advice to "disperse the cloud of doubt which envelopes the mind of the surgeon," by a blow with a book.]

Dislocation of the Thumb.

This is often a most troublesome accident.

[I cannot attribute this difficulty "to the numerous and strong muscles of the thumb," but to the form of the heads of the bones being thrust through between the lateral ligaments.]

The first bone of the thumb is dislocated from the metacarpal bone of the thumb. It is a consequence of striking a blow with the fist, or falling on the thumb. The nearer head of the first bone rests under the further head of the metacarpal bone, and consequently projects towards the palm.

Take the thumb in your hand, and bend it at the dislocated joint in the direction towards the palm.

[By this you push back the great head of the bone between the lateral ligaments. Do not persevere with violence in pulling upon

the thumb. The second joint has been torn off without reducing the first; it being impossible to overcome the resistance occasioned by the locking of the bones, tied together by the new position of the remaining ligaments.]

When the *toes* are dislocated, the difficulties are the same, and the rules applicable to the thumb and fingers are applicable.

Dislocation of the Jaw.

There is some imperfection in the forms of the joint when the lower joint is dislocated by yawning. It may be dislocated by a blow on the chin at the time the jaw is dropped.

[We hear of spasmodic action of the muscles dislocating the jaw during the operation of drawing a tooth. Dislocation has been produced in a boy by his attempt to bite a large apple! Once produced, dislocation of the jaw is apt to take place from slight causes, and on ludicrous occasions.]

When the dislocation is complete, that is on both sides, the mouth is open. If the jaw be forcibly raised, the inferior incisors project beyond the upper ones. The cheeks are full, and there are depressions before the ears; the saliva flows.

The reduction is accomplished thus: You wrap the corner of a towel round your thumbs; introduce the points of the thumbs thus defended deep into the mouth, and press down the last molar teeth: You have thus a fulcrum; now raise the chin by grasping it with the fingers.

[The condyles go into their place with a snap, and the thumbs are apt to suffer; slip them between the jaw and cheek.]

The jaw may be dislocated on one side only. You recognise it by the open mouth and oblique position of the teeth; by the prominence of the coronoid process producing a fulness on one cheek: There is a hollow before the meatus auditorius compared with the other side. The reduction will be accomplished in the manner above described.

LACERATION OF TENDONS.

In a healthful and vigorous person, the muscular strength and the resisting power of tendons correspond. By indolence, or confinement, the tendon degenerates, and may be ruptured by the natural action of the attached muscle!

The *theceæ* will for the same reason sometimes suffer; all tendinous and ligamentous parts deteriorating for want of the due stimulus to perfection of structure, which is their natural action and play.

[In sprains of the outer ankle by twisting the foot inwards, the tendons of the peronei, and their connections are injured when the surgeon thinks only of the perpendicular ligament of the fibula. Hence arise ganglia, &c.

In running up stairs, the toes slipping from the edge of the step, the annular ligament across the instep is sprained. In going down stairs, the heel slipping from the edge of the step, the anterior part of the ligament of the fibula, that which limits the extension of the foot, is sprained. These sprains are very troublesome. You must restrain the part until inflammation has subsided, and the torn fibres have united. But on the principle here noticed, there comes a time in which the joint must be exercised, in combination with the usual means of removing chronic inflammation.]

But the case of this kind of most importance, and very frequent occurrence, is *rupture of the tendo Achillis*. It happens in men of a certain age, who yet retain muscular strength, and who are tempted to exert themselves suddenly.

[The father of a family is tempted on a birth-day to join the dance of the younger people; and being lusty, heavy, and of sedentary habits, he says somebody has kicked him on the back of the leg, and so he goes limping to a sofa.]

The tendo Achillis may be quite torn across, or partially.¹ The fibres of the gastrocnemius or soleus may be torn from the tendon.²

[¹ I have thought I could discover a rupture of the plantaris tendon.

² During life the muscular fibre excels the tendon in strength, so that the muscle itself is seldom torn. Thus, when it is alleged that the rectus abdominis is torn in opisthotonos, it is the intermediate tendinous portion which gives way. So, with regard to the *rupture of the fasciculi of the gastrocnemius or soleus*, it is a tearing of the tendon at the immediate attachment of the muscular fibres. So of the vastus internus or vastus externus at the knee-joint.

With regard to rupture of the muscles of the back, think more of rheumatism. The diggers of canals have an idea that a workman is good for nothing until he has ruptured a muscle of his back.]

In the case of rupture of the tendo Achillis, the practice is obvious to the anatomist. 1. The knee must be bent; 2. the foot extended; 3. compresses lateral to the rupture applied, and a roller.

[I may not affront you by telling you to take care that neither compress nor roller shall fall between the broken ends of the tendon. Yet on consultation I have often found it so.]

The high-heeled shoe must be worn when the patient begins to move about.

[Both Monro and Hunter suffered by this accident. The latter continued to move about, keeping his heel raised and his knee bent. The ingenious surgeon will find no difficulty in doing this, by having a high-heeled shoe with a strap brought down from a circular round the thigh over the calf of the leg, and attached to the heel of the shoe.]

Ganglion.

Ganglions are distinct from diseased bursæ; they arise from a sprain, or some slight injury to the theca or sheath of the tendons of the hand or foot. In substance they resemble the structure from which they arise. They are firm and dense sacs, having a fluid soft and viscid, and not unlike synovia. In some instances a double bag may be seen on dissection, a finer inner membrane within the tendinous sac.

At first you should leech and foment; afterwards, when they are more confirmed, you may apply blisters and stimulating plasters, with compression: finally, they may be punctured, and their contents pressed out into the cellular substance, where it will be rapidly absorbed. Bursting these by a blow is an awkward proceeding, and not a sure one.

When these sacs form with some modification of structure on the foot, they are for the most part consequent on continued pressure and friction. They are called *Bunions*. The principle here (as every where when no specific action has been excited), is to avoid the cause.

[Mr. Aston Key gives a paper on this subject in Guy's Hospital Reports, No. iii.]

CHAPTER XIX.

OF BLIGHT AND MALFORMATION OF THE EXTREMITIES.

This is an obscure subject; one which occasions great uneasiness to parents, and much fruitless trouble to the surgeon. It is difficult to say on what it depends, that a part of the frame should be arrested in its growth, and that in the end there should be the arm, or leg and foot, of a child as it were, attached to an adult body!

[Thus one person has a diminutive finger: another has the whole extremity smaller than the other; perhaps weak and imperfect in some classes of muscles; or one side of the jaw is not developed; or the whole side of the face is smaller; or one eye is small, with perhaps a squint in that eye.]

It is, however, very necessary to be aware of this increasing defect, else the practitioner is led into great faults. It is an extensive subject, more fitted for lecture than for these volumes.

The club-foot belongs to this subject.

Club-foot.

The child is born with the foot distorted. The tarsus and metatarsus have the bones twisted, and their jointings imperfect. The toes and the whole foot are turned inwards.

[It may be turned outwards; hence the terms *varus* and *vulgus*; the first distortion inwards, the latter distortion outwards.

On dissection, I have found the defect less than could be imagined.]

The treatment consists in taking the foot in the hand, and gently but perseveringly producing passive motion in all the natural directions of the joints; thus exercising every part, and yet so that the infant shall be more pleased than hurt. When the foot is thus supplied by motion, it is put into a shoe with proper apparatus to restrain it. This must be readjusted when giving pain, and occasionally removed; but persevered in till the sole of the foot be turned to the ground.

[This kind of boot has an iron sole; a plate fixed to the side of the sole, which ascends on the leg, and is embraced by a collar below the knee. A strap going round the foot, and buttoned to the upright plate, gradually turns round the inverted sole.

When the club-foot has been neglected in childhood, it is a great misfortune; the dorsum or outside of the foot is turned to the ground, which, having no provision in a natural pad, suffers. When both feet are in this condition, the progression is miserable. It is in this condition that the attempt at reduction may be aided by the division of tendons.]

Another defect is a straight position of the foot, combined with a weak tendo Achillis.

In all these cases you may take the aid of mechanism, assisting the weak class of muscles with springs, and appending weights to facilitate the passive motion of the joints. These exercise your ingenuity, and give you a deserved preference to practitioners either ignorant of the principles, or wanting ingenuity.

In young ladies a weakness of the ankles is frequent; which permits the inner ankle to project, and the arch of the foot to sink. Attending to the constitutional source of weakness, and supporting the joint, you will require to exercise it.

[Walking, still permit the ankle to yield. Let her put her feet close together, and then curtsy by bending the knees. In this manner the ankle-joint is made to play without yielding inwards.]

Having finished External Injuries, I reserve the DISEASES OF THE JOINTS, a distinct and very important subject, for the last division of the second volume.

DIVISION II.

OF THE DISEASES OF THE NATURAL PASSAGES, AND THE OPERATIONS PERFORMED FOR THEIR RELIEF.

The operations required to be performed on the natural passages—the urethra, rectum, œsophagus, and larynx—require great nicety, and a mature judgment; and indeed, innumerable lives have been lost by ignorance and a rash hand in treating this class of diseases.

§ 1. THE OPERATIONS ON THE MOUTH, PHARYNX, AND LARYNX.

The Tongue.

The affections of the tongue are of consequence to both physician and surgeon—since they may be symptomatic of diseases requiring surgical assistance. The subject is of great intricacy. The nerves of the tongue, their various relations, and the sensibilities of the tongue form a subject of much interest. You find loss of sensation at one time—at another loss of taste—and, worse than all, vitiated taste. You meet with strange sensations in the tongue; as of a hair drawn across it—or as if it were clogged with viscid matter. There is temporary loss of speech; or loss of the power of deglutition while speech is retained. These are often symptomatic of various other affections or diseases, which must be taken into view. By such considerations we are brought to understand the various sympathies of the tongue, and led to comprehend how much surgical complaints may depend on remote causes, *e. g.*

Ulceration of the tongue.—The tongue is often ulcerated from playing on a tooth, which has become ragged by a portion of the enamel having broken off; or on tartar which has collected on the teeth. The incessant motion causes the superficial abrasion to become a callous ulcer, with sharp edges and a depressed foul centre. Without such mechanical cause, disorder of the stomach will produce these ulcers.

[Small recent ulcers of the tongue may be touched with the solution of the lunar caustic, to take off their sensibility; but we should follow this by attention to the diet and the state of the bowels. In more confirmed ulcer, you file down the ragged tooth, and order a vomit (which has a remarkable effect, by agitation of the viscera), and insist on regular discharges from the bowels; following the vomit with such tonics as the powder of cusparia and rhubarb; correcting acidity, if it prevail, by the infusion of columbo and liquor potassæ, or magnesia and the liquor calcis. Failing these, I

have been successful with small repeated doses of the subnitrate of bismuth in combination.¹ When the edges of the ulcer have been hard, I have used pounded sugar, with a few grains of calomel. The patient wetting the point of the finger and touching the powder, rubs it gently upon the hard substance.]

A simple ulcer on the tongue, by the continual motion, may become so irritated as to resemble a malignant disease, growing hard and irregular on the edges, and deeply excavated. I have seen such ulcers yield to proper treatment, with the addition of a bag embracing the tongue.

[The mercurial fetor of the breath, and the tongue indented against the teeth, will enable you to distinguish the ulcer which arises from mercury.]

The *scirrhus tumour* of the tongue may be operated on either by the ligature or the knife. In order to the performance of the first, you take the curved needle and ligature; pass it through the tongue behind the tumour; cutting off the needle, and consequently having two ligatures, you tie them so that they embrace the tumour between them. It is remarkable that an organ which appears, and which is in reality, so delicate, should sustain this severe treatment with little irritation.

[If it be possible to cut out the diseased portion of a triangular shape, and the hemorrhage be stopped without the cautery, the sides of the wound may be drawn together with a ligature.

The surgeon never appears to less advantage than in attempting the removal of deep-seated disease in the tongue by its extirpation. The tongue must be rudely seized with hooks and drawn out; the portion is then cut off, and the actual cautery used to stop the hemorrhage. I have never performed this operation. If you think of doing it, examine well the state of the glands in the neck and under the jaw. If they be diseased the operation is ineffectual, and you are deeply responsible. It is recommended to make incision into the tongue, when swollen from mercury so as to endanger suffocation; yet that is an unhappy time to make incisions at all. I have seen the tongue chronically enlarged, and have been inclined to attribute this state to quack pills, which had been taken regularly and for an indefinite time. Antimony thus taken might produce the effect.]

Division of the Frenum Linguae.

[The frenum is sometimes unnaturally strong and short. It may affect the speech, but cannot interrupt sucking; for sucking is effected by the sinking of the jaw. Nurses will insist on the divi-

¹ Borax and sugar is the best application, or borax and mel rosæ.

℞. Sodæ Boracis	.	℥ii.
Aquæ Rosæ	.	℥viii.
Mellis despumat.		
Tinct. Myrrhæ	.	aa ℥, as a wash or gargle.

sion of the frenum. The operation is not devoid of danger, for a small vessel being opened, the infant sucks and swallows its own blood. Mr. Cruickshanks (the same who wrote on the lymphatics) snipt a child's frenum; by the time the mother had walked home to the city the child in her arms was dead! with an immense coagulum in its stomach.]

If you must cut the frenum, do it by passing the curved bistoury behind the ligamentous edge, and draw it to you. Your assistant in the mean while introduces his forefingers, opens the mouth, and forces back the tongue so as to stretch the ligament; or you may take hold of the frenum forcibly between the finger and tongue, and feeling the firm margin of it, snip it across. The scissors with a guard are useless.

[The frenum has its use; to cut it quite through is to endanger the tongue being swallowed back into the fauces, so as to suffocate the child! J. L. Petit reduced the tongue to its natural place twice, and on the third occasion the child was suffocated: "Un enfant, à qui on coupa le filet immédiatement apres sa naissance, etouffa cinq heures après."—Tom. iii. p. 267.]

Ranula, grenouillette.—This is an incysted tumour which forms under the tongue. It is transparent, having distinct veins upon it. It enlarges, pushes back the tongue, and interrupts mastication, deglutition, and speech.

[I have taken the patient to old and experienced practitioners, to ask what they called the complaint? They have answered, Ranula! I have then passed the Anel's probe into the sublingual duct, showing it to be quite pervious. Therefore, I do not give the definition—"a tumour under the tongue from an obstruction of the duct."

An obstruction of the sublingual duct is very painful, and is attended with symptoms not to be mistaken. You see the duct inflamed and obstructed with matter; and when the patient eats, *i. e.* when the salivary glands are excited, there is a pain which extends under the jaw, and which is to be attributed to the distension of the duct and gland with saliva.]

Treatment.—When you puncture the ranula, a glairy fluid escapes, but the relief is temporary. By puncturing again and again, the sac thickens, but the disease is not cured. Some pass a seton across it; a most unpleasant mode of cure, and not certainly effectual. I have operated on this tumour by passing a strong tenaculum through it, and then placing the blades of the curved scissors behind the tenaculum, I have cut away the greater portion of the sac. In addition to this, we dip lint in solution of caustic, and put it within the remaining portion of the sac.

Salivary calculus under the tongue.—These calculi are to be thought of when the patient complains of the symptoms described as attending obstruction of the sublingual duct. The duct may be sounded with the probe, although the calculus is generally to be felt with the finger under the tongue.

They are to be removed by slitting up the duct.

[In Mr. John Bell's work you find the title of Salivary Tumours, and under it a graphic description of most formidable tumours about the throat. I am not satisfied that these tumours are salivary; at all events, the seton will not obliterate them. They should be largely opened; the sac, as far as possible, drawn out and cut off. Nor should the surgeon who miscarries be severely censured; they are unmanageable. See Sacculi above the throat. Hildanus and Marchetti give examples of the worst effects of ranula.]

The salivary glands are not often diseased. I have more than once taken the tumour of the parotid gland (which the surgeon supposed he had extirpated,) and shown that salivary gland to be healthy, and have dissected out a diseased lymphatic gland from under it! I have done the same with the tumour which the operator called a tumour of the submaxillary gland, and have shown the mass to consist of a diseased lymphatic gland, surrounded by the salivary gland in a natural state. I have stopped the surgeon in the midst of his operation, and showed him that the parotid retained its peculiar and distinguishable character; and inducing him to cut deeper, have seen him dislodge the lymphatic gland, the real tumour, from under the parotid gland.]

Fistula of Steno's duct.—When the saliva flows from the cheek (in consequence of a wound,) you have to consider whether this proceeds from some of the lesser branches, or from the substance of the gland, or from the trunk of the duct. In the former case, steady pressure on the part, the jaw being braced firm, will probably suppress the discharge. Escharotics, or the nitric acid, may be at the same time employed.

[The motion of the jaw, and the excitement of the gland by mastication, defeat the surgeon's intention. In the operation on the main duct, it is necessary, by general and very considerable pressure on the whole gland, to suppress or diminish the secretion.]

When the fistulous ulcer arises from the division of the duct itself, it requires a very nice operation, and a great deal of attention. It will be in vain to use a canula.¹ The better way is to pierce into the mouth, and to keep the passage open by seton, whilst you heal the outward wound.²

[¹ Mr. John Bell, in using the canula, let it slip, and it went backwards so far as to require a deep incision behind the angle of the jaw for its extraction.]

² Construct the seton in this fashion: take a ligature of four threads, and doubling it, attach to the loop a fine piece of fishing-gut, or a strong hair. By this *gut* or hair you draw the seton from within outwards; the threads keep open the inner part of the wound, whilst the gut hardly interferes with the union of the outer wound, whether it shall be brought together by the twisted suture, or treated with nitric acid.]

Tonsils.—It has been observed, on the subject of abscess, that a gland being inflamed, produces suppuration exterior to it. It is in

this way that, in *cynanche tonsillaris*, suppuration occurs in the folds or arches of the palate. I advise no deep punctures in search of this matter. Put plaster round the bistoury, in such a manner as to let the point project, and scarify the projecting glands, using a gargle to encourage bleeding.

[I have been two or three times called in haste to perform bronchotomy for quinsy. I have found the patient lying with his head and neck covered with flannels, and a stimulating liniment or poultice about his neck, and he snoring in great terror. But upon assuring him of safety, making him sit up, and bathing his neck and temples with vinegar and water, he breathed freely, and there was no longer thought of dying! I say this I have often found to be the result; but I shall not deny the possibility of bronchotomy being required.]

The frequent return of inflammation occasions a chronic enlargement of the tonsils. There is in this nothing malignant, and it may be reduced without an operation of *extirpation*. Scarification and gargle will diminish it. Projecting portions may be cut off, or a larger part included in a ligature.

To throw the ligature, you pass a strong tenaculum through, near the base of the tumour. You put the mouth of a curved canula on the point of the tenaculum, and holding them so, your assistant throws over the ligature, and with the assistance of a ring draws it tight.

The uvula.—The uvula, by successive attacks of inflammation, becomes relaxed, and hangs low, so as to tickle the glottis and cause a continual dry cough, and sometimes vomiting.

You may draw it up by the application of cayenne pepper and astringent gargles, or at length you may snip a portion off. Seize it with toothed forceps, or pierce it with the tenaculum, and snip it with the scissors. Unless held it slips from the blades of the scissors.

Fissure of the palate.—Some of my pupils, in imitation of M. Roux, have succeeded in closing the fissure of the palate. It is an extremely difficult operation; but, on the other hand, the effects of this imperfection are such as to make a successful operation a real triumph of art. He who would succeed in this operation must study for himself; he will hardly follow a description. My conception of the operation is this;—that it be done in three stages: 1. I would advise the ligature to be passed first; 2. Then to pair the edges by means of the hook and curved scissors; 3. To incise the sides of the velum or palate, so as to give freedom to the flaps; and, finally, to draw the ligatures.

The Harelip—Cancer of the Lip.

As the operation for cancer of the lip so generally succeeds, it gives us reason to doubt whether the disease is cancer, or any thing more than an ulcer aggravated, and the base thickened by the

incessant motion of the lip; and probably this is the reason that the disease is generally in the lower lip, which has by much more motion in speaking and mastication than the upper lip.

[This consideration suggests, that in those diseases of the lip we should try the effect of arresting the motion of the part. A poultice does this in some measure; but if, in addition to the application to the sore, the lip be arrested in its motions by the application of straps across it, we may have the pleasure of seeing a gradual amendment without operation.

Whilst you strap the lip to keep it steady, touch the sore with a painting brush, dipped in solution of corrosive sublimate, and dress with a liniment consisting of the pulv. hydrarg. cum cretâ, Peruvian balsam and honey.]

When the portion is to be cut out, you may make your assistant stretch the lip over a bit of wood, shaped so as to enter between the lip and the gum. Whilst he stretches the lip over it, he at the same time compresses the artery against the edge of the wood. You operate by entering the point of the scalpel at the base, and cutting first on one side of the disease and then on the other, so as to take out a triangular portion.

Or again, your assistant taking hold of the lip on both sides of the diseased portion, you seize the centre part, and with a long sharp pointed knife, passed from within outwards, you cut out a triangular portion, including what is diseased.

Let the part bleed a little, and then pass the hare-lip needles, and use the twisted suture.

[If you operate on any occasion, use all your care and skill. The needle should be passed in half an inch from the edge of the cut, and brought out close to the inner edge. See that in entering it again into the opposite lip, you do it at a point exactly corresponding. A second needle will be required. Throw the thread over this needle, so as to stop the bleeding, and pause a little. Then taking off this thread, or adjusting it with more care, bring the edges accurately together, and twisting the ligature round the needle in the figure of 8, spread out the threads so as to cover the space between the needles. The blood will form them into a plaster, so as to keep the edges supported and adjusted.]

If the operation fails, it is from drawing the edges of the wound too much together, and not allowing for the swelling of the parts.

The patient is enjoined neither to laugh nor speak; and if there be danger of the lip being drawn, the needle may be protected by the dry suture; that is, by plasters attached to the cheeks with ligatures, which may be tied over the lip.

Some surgeons are satisfied with using a common surgeon's needle and thread, to bring the edges of the wound together. This does very well when the lip is accidentally divided, when there is no loss of substance, and the tumefaction pushes the surface together.

The operation for malformation of the lip requires the exercise of ingenuity on the same principles.

[1. The lip is simply fissured. 2. It is deformed if there be two fissures with an intermediate portion, which, by the condition of the portion of muscular fibres belonging to it, stands out. 3. With the fissure of the lip there may be a defect of the palate plate of the upper jaw, so as to form a communication between the mouth and the nose.]

The simple fissure of the lip is operated on much in the manner described: the edges of the lip are cut so as to present a broad bloody surface of contact when brought together by the twisted suture.

[If one or more of the incisor teeth project, they are not to be taken away, but forcibly crushed down; for which purpose it may be necessary to divide a part of the alveolar process with a small chisel.]

If there be two fissures with an intermediate portion, I would **not** advise that portion to be cut away as I have seen practised: separate it from the gum, force the shelving piece of wood under it, and with the scalpel and tenaculum give it a triangular form, and so pare the edges of the lateral fissure that the centre piece may fall in wedge-like between them.

The operation may be done at twice; the centre portion to be joined to one side, and when the adhesion is perfect, complete the operation by joining the other side.

When the operation is performed in a child, in the third and worst condition of the case, we may expect the chasm in the roof of the upper jaw to diminish. The breadth of the face in those cases proves that the upper jaw bones are separated as well as cleft; and something may be done to approximate them. In the dead child I have found it possible to close the chasm, by squeezing the cheeks together; and I must therefore suppose that good may result from pads on the cheek of the little patient, pressing with a spring truss. At a later period, a metallic apparatus, laying hold on the teeth and alveolar process, and screwed together, or acting with a spring, may tend to close the fissure.

As a last resource, the dentist makes a false palate, which enables the patient to speak and eat with comfort to his friends.

Formation of a New Lip.

When the lower lip is destroyed by ulceration, the case is a very miserable one, as the saliva flows continually. My friend, the late Mr. Lynn, of the Westminster Hospital, (the neatest operator of his day,) performed a cure very happily.

[He kneaded a piece of wax, moulding it to the vacuity; and having ascertained what was necessary to supply the defect, he laid this down upon the integument of the chin. Then calculating the loss which would be consequent on the twisting of the flap, he cut

and dissected up the skin, leaving it at its upper side. He then pared the edges of the remaining part of the lip, and turning round the flap, he fixed it in the manner described with needles and the twisted suture.]

Of the Teeth, Gums, and Jaws.

You can have no interest in the subject, nor understand the diseases of the teeth and gums, unless you make yourself familiar with the anatomy and physiology. The subjects which should occupy you are, 1. The state of the gum before the rising of the teeth. 2. The succession of the teeth, and their time of rising. 3. The connection of tooth, gum, and alveolar process. 4. The formation of the permanent teeth. 5. The peculiarity of the *dens sapientia*, &c.

Scarifying the Gums during Dentition.

[You will notice with interest that the progress of the teeth whilst still within the jaw, even during bad health, do not produce symptoms; and that it is the pressure on the gums, and consequent ulceration of the surface, that occasions extraordinary distress. This, however, does not take place always, or necessarily, but is a consequence of irritability connected with bad health. The symptoms are, itching in the gums, with a copious flow of saliva; the gums become red and swollen; there is purging, or a cough, and the child is fretful and feverish. In a greater degree this local irritation produces a furred tongue, and vitiated or interrupted secretion of bile. (See the Essays of Dr. Cheyne on the Atrophia Ablactatorum.) Convulsions, partial or general paralysis, may supervene.

(I may here observe, that the irregular rising of the teeth at a later period, produces many affections; and if there should appear to be a crowding of the teeth, with squinting, fever, pains, or convulsions, it is proper that one should be drawn.)]

There is no doubt that a touch of the lancet on the distended gum, which lets the tooth free, is very often attended with the disappearance of the most formidable symptoms. The late Dr. Dentman was not satisfied unless the lancet rattled along the range of concealed teeth. This can be of no service; it is the rising tooth that irritates; whilst this practice, by opening all the sacs, makes the teeth rise irregular in form and black, and even affects the formation of the permanent teeth.

[But in all cases of distress during the period of teething, never forget that there are two causes in operation, and that it is peculiarly necessary to guard the child's health; and if the child has been improperly weaned, maintain your opinion against the mother's prejudices, and let the child be fed by the breast of a healthy woman.]

You will be asked to give advice on the propriety of performing operations on the teeth; and you should carry some facts in your memory.

As the alveoli partake of the constitution of the teeth, rise with them, decay with them, and shift with them, we understand how the teeth may be made to change their place by introducing wedges between them. The overhung jaw may be corrected by making the patient close his teeth on an inclined surface.

A tooth is provided with a disposition to rise, which is intended to counteract the pressure of the opposite teeth. Accordingly, when teeth are lost on one jaw, those of the opposite jaw are apt to jangle and get loose. This is a reason for pivoting teeth, viz., to save their opponents.

We have no means of acting directly on the teeth, and we can only maintain them by operating on the gums. To keep the gums firm is the object. Sometimes they require scarifying; rubbing with the finger is good; or brushing with tincture of myrrh and bark, and spirit of camphor; and when there is toothach, destroy the acidity by using pure chalk with spirit of wine.

Parulis.¹—There is something not easily to be understood in the matter of caries of a tooth, but there is no place for discussion here. When a *gum-boil* forms, it is a miniature representation of what I have described under abscess. The inflammation in the tube and cavity of the tooth causes pus to be formed at the fang, which gradually makes its way, opening the alveolar process and pointing in the gum. It is to be opened, which gives immediate relief.

[In the old authors, *parulis* is an inflammation and abscess in the gum. When there is a fleshy excrescence, they called it *epulis*.]

Pivoting.—If you make a section of a tooth, you may observe that the canal is not always round and equal in the calibre; hence arise accidents in the operation of pivoting.

A tooth being carious, and partly gone in the crown, may be cut off, and another joined to the fang by a pivot. The crown being cut off, and the surface of the root or fang made smooth and a little grooved, an instrument is put into the canal, by turning which round the nerve is cut and extracted, an operation of great pain; but sometimes the canal being unequal, the nerve is not effectually destroyed by twisting round the instrument. The consequence is grievous, for the pivot of the new tooth bruising the nerve, gives rise to pain and convulsion.

Another effect is to be observed in the diseased state of the tooth, and consequent gum-boil; the matter is permitted to make its way out by the hollow of the tooth, but by the pivoting this is prevented, and the effect is occasional inflammation, pain, and discharge of matter by the gum.

The patient finds himself more comfortable when the dentist furnishes him with teeth, set in a range of gold or ivory, with so

exact a fitting to his remaining teeth and gums that no irritation is experienced.

Necrosis.—The teeth being decayed, and causing inflammation deep in the jaw, give occasion to necrosis of the jaw.

The tooth, gums, and alveoli, as we have noticed, are one in constitution; and I have seen the whole range fall off in mortification after fever, reducing the jaw to the state of that of a very old person.

[This would lead us to the disease to which children crowded together and ill-fed appear to be peculiarly subject, *the canker of the mouth, gangræna oris*. Read John Pearson, *Principles*, p. 287.]

Epulis.—This is a tumour partaking of the nature of the gum from which it arises—that is to say, it is smooth, firm, insensible, and vascular. It rises between the teeth, in time displaces them from the jaw, and presses into the mouth.

When this tumour is cut off, it quickly rises again, and it will not be extirpated without the cautery, or the removal of the gum, teeth, and alveoli connected with it.

[You cut down between the teeth on each side of the tumour, using the small saw to cut the alveoli. You then, with strong cutting forceps, embrace the whole, and cut it, the gum and alveoli, from the base of the jaw, and you would do well to apply the actual cautery to the remaining surface.

The artery spouts out freely, but previously to the operation you calculate the chasm to be left in the jaw. You cut a piece of cork to correspond with it, and surrounding this cork with lint, you dip it in the muriated tincture of iron, and place it in the chasm; you then close and tie up the jaw, so as to compress the bleeding surface.]

When the disease is not radically removed, it grows out frightfully into the mouth, and shoots its roots into the jaw. When in the upper jaw, it shoots into the antrum, and from thence it extends and fills the cavities of the face.

A tumour of a similar character rises from the antrum, of which presently.

Before leaving the subject of the teeth, we must contemplate another effect of their disease—the formation of an abscess in the lower jaw (*spina ventosa*.)

[The term was invented when churchyard bones were collected, and when the soft tumour or the contained matter had disappeared from the cavity.

The lower jaw, for example, expands and grows under the influence of disease; and this matter being freely evacuated, the walls of the bony abscess happily collapse again.]

But too often there is a tumour, a morbid growth in which the jaw participates, and which requires the whole to be taken away. The most remarkable instance I know of, and the boldest and most

successful operation of this kind, was performed by Mr. Syme. The cast and tumour is in his collection.

[When we consider the subject anatomically, by which I mean the attachment of the tongue by its muscles to the internal spine and symphysis of the jaw, it occurs to one that, when the jaw is taken away, the tongue will be drawn back by the styloid muscles, and the patient suffocated. In fact this did occur in Mr. Syme's case, but the tongue being held forward for some time, the action relaxed, and the patient ultimately recovered.]

ABSCESS AND TUMOUR IN THE CAVITIES OF THE FACE.

[Dropsy of the maxillary sinus is said to be a consequence of obstruction of the communication and the nose. I have never seen the disease.

Abscess in the cavity of the maxillary bone may be suspected when there is a pulsating pain deep seated in the face, after which there is a colourless puffiness of the cheek. You will not mistake a common faceach or a toothach, which you will find attended with tenderness of the cheek.]

A patient will present to you with one side of the face enlarged, and somewhat œdematous. You must examine into the nature of this swelling. It is not a mere swelling from toothach. It is chronic. It has enlarged very gradually. Is it matter in the antrum? Has an abscess formed there from disease of the teeth, the fangs of which project into that cavity or reach its floor? Or is it a more formidable disease of the antrum, a tumour?

[You strike the anterior molar teeth and find them tender, and you observe matter oozing by the side of them,—this is favourable, it indicates abscess. The abscess may make its way into the nose, or between the alveoli and cheek.

The case being disclosed, the second molar tooth and all the teeth which are diseased should be drawn. It may be necessary not only to draw the second molar tooth, but to perforate through the socket into the antrum.

But unless the discharge be free and the relief perfect, a larger opening should be made by perforating the side of the antrum above the alveoli.

The patient should have emollient gargle to take into his mouth, and press up into the cavity. There is no necessity for a syringe.]

I have said it is happy when matter is observed, because this abscess is a mere effect of irritation, and when the cause of it is withdrawn, the cavity falls into a natural condition. But it may be a tumour, a solid mass with a tendency to morbid action and rapid growth. Then, indeed, it is a formidable disease.

[This *fungous tumour* presses out the walls of the antrum, the alveoli soften, and the teeth appear to stick in a soft mass. The

cheek is thrust out and the face disfigured; the nasal wall of the antrum is pressed towards the cavity of the nose.

To be determined, and to act decisively, we must look forward to the consequences. This fungus, soft though it be, in time destroys all it meets. It raises up the socket and presses out the eye. It goes back upon the throat and presses upon the eustachian tube. It presses on to the opposite side of the face, destroying the ethmoid and centre part of the sphenoid bone. It projects into the mouth. Having thus encumbered and destroyed every external organ of sense; speech, taste, smelling, sight, hearing gone,—it presses through the cribriform plate of the ethmoid bone, and reaches to the brain; and so the patient falls comatose.

Now we perceive the necessity of bold measures at first.

I have succeeded in destroying it by taking away the alveolar process in the range of the upper jaw, on one side, and laying open the bottom of the cavity, or rather exposing the tumour and then setting to it, with the actual cautery.

This is not a painful operation, however dreadful in the contemplation. You raise and defend the cheek (I think I employed a shoe-horn), and you bore in the cautery at every visit! I have found my patient crying because I went through the ward without applying the red-hot iron.]

In short, the destruction of these fungous tumours is not to be done at once, but by long continued severe treatment. One of the most severe operations, nay, the most severe of all, is dissecting or tearing away the half of the upper maxillary bone, containing this fungous tumour within it!—an operation which I have seen my colleague Mr. Syne successfully perform.

[See before you attempt this that the disease has not propagated itself backwards to the cells of the palate bone, and that it is still confined within the antrum.

The cheek is cut up with a decided incision from the lip to the margin of the orbit. The maxillary bone is separated from the jugum on one side, from the nasal process and the palate plate on the other. The floor of the orbit is taken away, and the posterior part, with all its branches of the fifth pair, crushed and drawn away! That the human frame can bear such an operation is wonderful: to witness it is a hard duty. I am decidedly of opinion that my mode of proceeding with the cautery is the mildest and most effectual.]

DISEASES OF THE CAVITY OF THE NOSE AND FACE.

[Turn to Mr. John Bell's fourth volume for formidable cases of tumour and polypus in the cavities of the face.]

Here, too, anatomy gives interest, and enables us to understand the nature of the diseases. You study the nerves of the face, the fine vascular exposed membrane which invests these passages, and

the delicacy of the bones which form the cells; and from all of these peculiar results arise. The sense of smelling is singularly disturbed in apoplectic diseases.¹ The sneiderian membrane is the most exposed, the least supported, of any of the frame, and its vascularity causes it to burst out in bleeding, often giving token of plethora, and often serving as a safety valve to the turgescence of the venous system.² The bones, too, by their formation and their delicacy of structure suffer, and at the same time produce an effect on tumours, hereabouts, that give them all the aspect of malignant disease without being so.

[The relations of nerves produce remarkable effects. *Sternutatio* is not always owing to irritation or disease in the nose, but to disorder of the stomach or intestines.

² *Hemorrhage*.—Epistaxis is frequent and harmless in youth; more deserving of attention when in the adult, it is attended with weight, pain, heightened colour, and pulsation in the temples; and still more when there is lassitude, weight in the limbs, and cold feet. It is only when in excess that the bleeding is to be stopped.

When a person is bleeding from the nose he naturally pokes his head forward, which constricts the veins of the neck and acts like a ligature. The free erect posture with cold sponging is to be first attempted.]

Plugging is rather a disagreeable remedy. A cord attached to a catheter wire is passed from the nostril behind the velum. It is seized and brought through the mouth; a plug of lint being attached to it, it is drawn back so as to fill the posterior nostril, whilst the anterior is compressed.

This may be required when polypi are cut with the knife.

The better mode is to take a piece of gut tied at one end, introduced by means of a probe into the nose, and this is to be forcibly distended with a cold solution. It compresses the abraded surface.

Catarrh, *Coryza*, *Ozæna*, are affections of the mucous membrane which covers the bones.

You would do well to consider the constitutional derangements of the mucous membrane; its continuity and the rapidity with which a certain condition is propagated,—from the nose to the skirt of the lungs,—from the fauces to the verge of the anus, and observe what is said, p. 11, that the mucous surfaces may be influenced by general sympathy as well as particular organs. And here you may turn to your medical authorities on the subject of *Hemicrania*. Deschamps has a good description of “Migraine,” p. 206. See *Tic*.

Ozæna is an ulcer of the sneiderian membrane, which discharges a fetid purulent matter. It is at first attended with the symptoms of catarrh, with tumefaction of the ala nasi, and in the morning obstruction by viscid mucus. The discharge is accompanied with sneezing and slight hemorrhage. We are to fear that it may spread like a herpetic ulcer round the ala nasi to the cheek. This

is a scrofulous disease, or it may be a consequence of syphilitic cachexy; it is, at all events, connected with some defect of constitution.

[Distinguish it from abscess of the antrum, or of the cavities of the frontal bone.]

The preparations of copper and of zinc are used locally, with the citron ointment and white precipitate of mercury; also fumigations. But chiefly you must apply yourself to the constitutional cause.

[When the bone is carious, the smell is most offensive. But hardened mucus will by its presence excite offensive secretion, without breach of surface; and a piece of rag left in stopping bleeding, produces an intolerably offensive discharge.

The *septum nasi* often bulging to one side, and appearing like a tumour in the nose, is mistaken for a polypus. I have found it ulcerated from the application of caustic, the surgeon thinking in this absurd way to destroy the polypus!]

But without any mistake, this inequality in the position of the septum, by occupying one side and excluding the air from it, restricts the breath. From this imperfection the patient has desired relief, on discovering that he did not breathe freely through one nostril. Mr. Copeland has repeatedly perforated the septum with an instrument like a very small trephine, to the great relief and soulagement of the patient. It allows him to draw his breath more freely.

Polypus.

The sneiderian membrane gives rise to polypus. This disease presents in various degrees, and embraces tumours of very different dispositions.

[The membrane swells so as to obstruct the passages. This is sometimes a consequence of low, damp, and cold habitations; also of reduced health, as of that condition which follows small-pox.

This affection of the general membrane does not give rise to polypus, nor is it attended with pain or with hemorrhage. It is in this condition of the passage, that Le Dran and many following him advise the use of bougies, some of lead and some of elastic tubes. These are all wrong, for the passage of the nose is irregular, from the projection of the spongy bones, and the instrument pressing unequally, causes ulceration, and if persevered in, caries.

Use injections of zinc, and as a tonic, the mineral acids.]

Of *Polypi* authors make these distinctions; 1. Vascular and fungous; 2. Lymphatic; 3. Scirrhus; 4. Sarcomatous.

[I have no doubt that there are considerable varieties, but this I know for certain, that, from their situation, they are, whether simple or malignant, attended with formidable consequences.

When they arise from the membrane of the turbinated bones, for example, and escape through the posterior nares, being of a venous

and vascular nature, they expand, and by the constriction of the passage they bleed. Then again, if of a firmer nature, whether malignant or not, by their mere pressure they destroy the mucous membrane, make carious the delicate bones, and are therefore attended with pain, as if the bones of the face were squeezed in a vice, and with fetid discharge and with blood. Again, this matter is swallowed, and produces diarrhœa; and so the patient is at last exhausted by bleeding, purging, and pain!]

The primary symptoms are these. The patient does not breathe freely in damp weather. He loses his sense of smell. The tumour is perceptible, and plays backwards and forwards like a valve. On examination, a round, pale, or rose-coloured tumour is visible. Then it closes the lachrymal canal, producing a weeping eye. It pushes behind the velum, so that speech is affected. It presses against the eustachian tube, so that the hearing is lost. It will at length hang down upon the throat, and affect the epiglottis and the breathing.

[We can understand how it may become strangulated by its growth, shooting from the posterior nostril, and so drop off!]

You have to consider what course of remedies will correct disease of the mucous membrane, and to restrain its growth by strong injections of the solution of zinc. When a lobe occupies the front, even to the effect of injections, it is necessary that it should be taken away with the forceps.

An operation is performed with the ligature, which is so far effectual when the lobes of the tumour extend into the throat. The ligature is passed by means of the proper canula, through the nose. It is seized behind the velum with the blunt hook, and brought into the mouth. Then passing the fore and middle finger into the mouth, and with them expanding the noose of the ligature, the noose is pushed back behind the polypus, when the cord being drawn through the nose with the left hand, the whole tumour is caught, then the canula being pushed forward, it is noosed and strangulated.

Fifty times have I seen this spluttering operation attempted and fail! I have succeeded better in my object by using forceps, which could be fixed and their handles withdrawn. Introducing them and seizing the tumour, I have compressed it; let the instrument hang during the night, and brought it away with what it had embraced in the morning. There is in this no pain experienced, and with injections for which it makes room, I have succeeded in destroying the disposition in the membrae.

[I am half ashamed to mention what I see recommended, the knotted cord; a seton cord, so knotted that being drawn backwards and forwards through the nostrils, it acts like a file breaking down the soft tumour. In this way, however, viz. by a cord drawn from the nose through the mouth, sponge or lint saturated with astringent lotion may be effectually employed.]

The worst sort of tumours commence in the cavities of the face,

and commit ravages long before they present the appearance of polypus in the nose.

DISEASES OF THE PHARYNX AND ŒSOPHAGUS OR GULLET.

Having gone over the anatomy of the pharynx, the forms and nature of the arches of the palate, the muscles, the nerves of the tongue and pharynx; having considered the act of swallowing, the nervous sympathies, defects of actions—we come to the distinct diseases.

Bag formed in the pharynx.—There is a case narrated by Dr. Baillie, in which a cherrystone lodged in the lacuna of the pharynx, and by each succeeding act of deglutition, a little of the food was forced in, and formed at length a large bag.

[But these bags form differently, from an impediment in swallowing, in which the voluntary act of propelling over the food does not meet in corresponding automatic action, and the pharynx is distended; the food or drink distends the mucous membrane, pushing it between the fleshy columns of the constrictor pharyngis. The bag thus formed increases gradually by what is deposited in it, until its size becomes so considerable as to press on the Œsophagus, and the edge projecting like a valve, receives the greater part of what is swallowed !]

This is a most distressing condition, the unfortunate man starving with food before him.

Sacs are formed in another way, by suppurations behind the pharynx bursting into the passage.

[This is a matter which should alarm us for suppurations which communicate with the passage for the food. We have already learned that inflammation of the throat is prone to form suppurations exterior to the tube. In some (happily rare) cases the abscess breaking into the passage, the food falls into it, irritates by its presence, and keeps up the abscess. The bag thus formed has no covering of muscular fibres like that described by Dr. Baillie, and there is no reaction or vomiting up of its contents. We have distress, hectic fever, and starvation !]

Washing out the sac, feeding with a tube, are the means suggested, and I have thought of opening the sac from the neck, that matter may not lodge, but have an exit to be washed away.

Stricture of the Œsophagus.

[Recollect the peculiar structure of the Œsophagus, the nature of the mucous membrane which forms its interior, and the looseness of its muscular coat which is at the same time so strong as to be called *tunica vaginalis*. It is in the inner mucous membrane that the permanent stricture takes place. But the muscular and vaginal coat is very often affected, and if you consider the complication

of muscles, and the intricacies of nerves about the throat, you will readily comprehend how spasm accompanies and aggravates the permanent stricture, and is often the sole cause of difficulty, the muscular derangement being taken for permanent or true stricture.

In the hysterical female, the muscular coat of the œsophagus is spasmodically affected. In the middle of dinner she will be incapable of swallowing a morsel; she will have this repeatedly, and for years, until it becomes almost habitual; but depending more on the state of the stomach than of the uterus.]

There is a remarkable analogy between the œsophagus and pharynx, and the urethra. Both are canals lined with a mucous membrane, governed by peculiar sensibilities, tied up or connected to neighbouring parts, and surrounded with irritable muscular fibres: We are perpetually exposed to mistake the nature of their affections, and to miscalculate the extent of spasmodic affection.

[The pharynx, of a conical shape, terminates behind the cricoid cartilage, where it is firmly bound, and this is the narrowest part of the canal; and as the catheter introduced into the urethra pitches on the side where the tube is bound up by the ligament to the ossa pubis; so here when the œsophagus bougie is used, it is apt to lodge by the side of this narrower part of the tube.]

The symptoms of stricture are, a gradual increasing difficulty in swallowing, until liquids only, or small morsels, or soft food, can be taken. Mucus collects about the part, and hence cough and the action of vomiting is excited. The attempt to swallow produces distention of the pharynx and pain in the ears.

[I have so often traced this complaint to quinsy, that I have no hesitation in saying that it is a product of inflammation. Some formidable cases have presented to me, which were produced by obvious causes,—swallowing boiling water, swallowing soap lees.]

Treatment.—We must in all cases alleviate the spasm, by friction of the neck with ether, camphor, and the ol. succini. The compound galbanum pill may be ordered, with an antispasmodic draught, and a linctus given with opium, to sip, and which should be allowed to lodge about the stricture. Dashing of cold water is in some cases of pure spasm effectual; to which we add all the means of resolving hysteric spasms, as clysters of assafœtida. I could quote authority against using the bougie at all, in stricture of the œsophagus, yet the relief is inexpressible! The mucus collects, the irritability increases, and the difficulty of swallowing and disposition to retch is frequent: this is, at all events, temporarily removed by passing a bougie.

The use of the bougie in stricture of the œsophagus ought to be an operation of caution and delicacy, for by rudeness the tube may be ruptured, and then a lamentable death is the consequence. The liquids swallowed find passage, but they are forced into the cellular membrane around the gullet, and pain and increased distress is added to the suffering from inanition.

[The fluid destined for the stomach finds a ready passage through

the loose cellular membrane of the neck into the mediastinum, where I have found it!

[That surgeons of experience may commit this fault I am fully aware. A. B., a surgeon of the first eminence, could not pass a bougie. The patient went to C. D., who did it at once. When the surgeon met him, how did you accomplish it? says A. B. "Why, by a mode I have." The œsophagus was perforated, and the patient died in three days after.]

Therefore do all with caution; there is no cure performed in this case by forcing a bougie, even if it go through the stricture.

I have been in the use of passing the bougie at regular intervals, so as to preserve the passage free. There is another method, effectual and safer; by using a kind of probang, with a conical piece of sponge. This dipped in a weak solution of the nitrate of silver, and passed repeatedly through the stricture, dilates it, clears away the mucus, and removes the disposition to spasm. The patient swallows with comfort for a long time after this process. But to the question we must come at last—what is to be done when a wretched creature is actually starving, in consequence of stricture in the œsophagus? I look in vain for authority and advice. I have attempted, by incision on the side of the neck, to divide the stricture and use a tube, but failed.

[If this operation is to be performed, it must only be in the most imminent fear of death from starvation. The incision should be made on the left side of the neck; when completed, a catheter may be passed into the mouth and pharynx, and with the point of it, the lower part of the pharynx may be brought out through the incision; but you must not cut into the tube above the stricture, else in future every thing swallowed will escape there. The œsophagus must be opened below the stricture, a tube introduced, and the patient fed and fostered for a time: after which attempts may be made to force the stricture from below.]

You will do well to recollect that there is a scirrhus-contracted œsophagus as well as of the rectum, in which no operation need be attempted, and where you must confine your efforts for relief to emollients, and issues or setons.

[With regard to stricture lower in the œsophagus, I have not met with them. And remember how you may be misled; 1. by aneurism in the arch of the aorta; 2. by suppurating glands in the mediastinum; and 3, by scirrhus and ulceration of the œsophagus itself.

Whatever interrupts the continuity of action in the muscular coat of the œsophagus, or causes spasm by ulceration and morbid sensibility, will in symptoms resemble stricture of the tube.

FOREIGN BODIES IN THE PHARYNX AND ŒSOPHAGUS.

[You will remember that in the act of swallowing, the guard of the wind-pipe is not a mere piece of mechanism, for the sensibility of the neighbourhood of the glottis is such, that it commands the muscular action of the glottis, and closes the chink as the morsel passes over. Hence it is that any thing sticking and exciting spasm, without actually closing the passage, will notwithstanding suffocate.

When a piece of meat or gristle stops in the pharynx, there is then danger of choking, and a man may die of an obstruction, which might have been removed by a long finger, the handle of a spoon, or any thing which, by unfixing it, enables the muscles of the throat either to reject it or to swallow it.]

The pharynx being funnel-shaped, the morsel sticks at the contracted part of the tube, just behind the cricoid cartilage. Do not push the morsel with the probang, until you have endeavoured to fish it up, for you may impact it more firmly. If it be of moderate size certainly it may be pushed past the sensitive glottis, and the person instantly relieved; and this may be done by any thing at hand,—the handle of a spoon. It is recorded to have been done with a leek!

I have always advised my young friends on going into practice to have a good store of probangs, hooks, and forceps, of every size and curve.

Bones, pins, and indeed all indigestible sharp bodies, are to be carefully withdrawn; for which various contrivances will suggest themselves. For example, you could take a piece of fishers' gut or bristle, and loop it on the end of a bougie, making a dozen of turns, so that it would catch a sharp or projecting body.

A wire may be twisted so as to acquire firmness, or to take a curve suited for the passage, and the doubled extremity of it may be bent up into a loop, and in the form of a blunt hook. This being passed between the side of the tube and the foreign body may unfix it, and, with the assistance of the natural action of ejection, bring it into the mouth.

You will not let yourself be deceived by the patient's sensations. When a fish-bone has hurt the surface in passing, it gives a sensation which persuades the patient that it is still there.

If such a body does stick it festers or causes ulceration, which, from what has been detailed, is not a light circumstance: therefore there is every reason for having the body withdrawn.

[A pin sticking across the pharynx has penetrated into the internal carotid. The *preparation* was in Dr. Hooper's collection.]

A man that cannot invent such an instrument for the nonce, is not likely to use the most perfect with dexterity.

In all operations on the throat, the first duty is to give assurance

to the patient that he is now safe, since you may by that calm his perturbation.

It may become necessary to perform œsophagotomy, for the extraction of the foreign body. It will not be a difficult operation for an anatomist.

[1. An incision anterior to the sterno-mastoid muscle, dividing the platisma myoides as well as the skin. 2. Go down with the handle of the knife upon the omo-hyoideus. 3. Introduce a lithotomy staff by the mouth; make it project in the neck, and open the tube by cutting upon it. 4. Introduce a pair of forceps into the groove, and by separating the blades enlarge the opening, so that the finger may be introduced and the body felt; after which, with the forceps and the blunt hook, you withdraw the body.]

On the subject of foreign bodies sticking in the œsophagus, consult the Mem. of the Acad. of Paris, vol. i. p. 444, a précis by M. Hevin. The paper is full of instances, which, by perusing, you are made to think of many contrivances.]

The stomach pump.—When I tell you that I have found, *on dissection*, the injection of broth destined for the stomach, in the cells of the lungs, you will be careful in introducing a tube into the stomach.

Putting a dry towel on the fore and middle fingers of the left hand, you lay hold of the tongue and bring it forwards; this is for the purpose of undoing those folds of the passage against which the tube may litch. But those who give this advice should have said also, that by pulling the tongue forwards, the epiglottis is raised, and if care be not taken to make the point of the tube move along the posterior part of the pharynx, it will very readily fall into the glottis. By pushing back the tongue the epiglottis is shut down. However, before fluid is poured into the tube, the mouth of it should be put through a sheet of paper, and the candle put to the mouth of the tube to see that no breath moves it; and you should also be assured that the tube can be pushed deep, another proof that it is in the œsophagus.

§ 2. OPERATIONS ON THE LARYNX AND TRACHEA.

Once more I repeat, it is essential to dissect and study the apparatus in the larynx and trachea, whose function it is to preserve us from injury every day and every hour, and yet which by a disturbed action produce suffocation. I have told you that I was early called to the study of this subject by the death of a fellow student, in whom after death there was found nothing else amiss than a small pustule on the margin of the glottis. Had I published each case and circumstance as they occurred, I should have anticipated much of what has been written on this subject.

[In visiting the collection of preparations in the College of Surgeons of Edinburgh, you may see that I diligently attended to this

subject. See preparations, Nos. 1276, 1284, 1285, 1293, 1295, 1298, 1299, 1300, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1335. These dissections were for illustration of my lectures.]

Wherever muscles are implicated in a disorder, the distress comes in paroxysms. Not only are the muscles of the glottis thus influenced in the cases we have to consider, but the muscles also of respiration generally. Thus, if a tumour, or an aneurism of the aorta, or of the arteria innominata, press upon the trachea, though it might be expected that the cause being mechanical the effect would be uninterrupted; yet it is not so—the difficulty of drawing the breath and the sense of suffocation comes in paroxysms, and in the intervals the patient is easy—even the pulse does not indicate the condition in any other way than when affected by the general weakness.

This principle we must carry with us in considering the diseases of the larynx.

Cynanche Laryngea.

I have had occasion to notice the manner in which inflammation spreads along the mucous surfaces. It is in this manner that an inflammation originally in the pharynx extends into the larynx, and then is attended with the most formidable consequences. Sometimes on holding down the tongue, the epiglottis may be seen standing up highly inflamed, and by its turgescence unfitted to its office of a valve; in which case there will be choking on the attempt to swallow. The first class of symptoms are consequent on increased sensibility in the passage, the second on turgescence of the membrane. This turgescence has of late been called œdema. See a paper of Dr. Edward Percival, Med. Chir. Trans. vol. iv. p. 297. Mr. Porter, in the 11th volume, gives the instance of a young gentleman, suffocated by œdema, dead in his bed on the morning following his first complaining of sore throat.

[The sufferer complains of sore throat; in the evening of the same day the respiration is loud and hoarse, the inspiration long and difficult; he cannot lie—he will not sit—he paces the room in great distress—and thus he passes the night in paroxysm, struggling for breath! He speaks in a hoarse whisper, and points to the pomum adamæ as the seat of his complaint. At the end of the second day, or morning of the third, the face is pallid and a little swollen; there is much anxiety in the countenance, whilst the pulse is frequent and labouring; he becomes indifferent, comatose, and dies.]

The important matter here for the safety of the patient, and for the surgeon's character, is to know that there is a period when tracheotomy is too late to do service.

The patient does not die in a violent paroxysm of suffocation; he is less disturbed, and in a manner to deceive you when all hope

is over. The lungs have become affected by the long labour of respiration; effusion has taken place, and he would die, however free the passages might be made.

[The case narrated by Dr. Farre, in which the operation was performed by Sir Astley Cooper, corresponds exactly with that narrated in the College Catalogue. Sir Astley says: "He is gasping for breath; every muscle that could be brought into action to assist respiration was employed; the pulse quick; the face and lips pale; the pupils dilated." When such are the symptoms it is too late to operate.]

Tracheotomy must be performed early to be successful; laryngotomy is an incision too near the seat of disease.

[When laryngotomy is performed, and a tube introduced, if the patient survive for a time another misfortune befalls; the pressure of this tube excites suppuration in the membranes. See the case described by Dr. Percival, *loc. cit.*, where on dissecting the membrane on the posterior part of the trachea, it was found coated with pus to the base of the cricoid cartilage. I found it impracticable to use the tube; Mr. Lawrence rejected it, and cut a portion out of the trachea.]

There is another disease which requires the division of the trachea in preference to the larynx—an ulcerated condition of the *sacculus laryngis*, a chronic condition of the parts, sometimes scrofulous, or it may be venereal.

[*Phthisis laryngea*.—When abscess bursts into the larynx there is danger of suffocation. This, however, is not from the matter, but the irritation of the ulcer in so sensitive a spot. The membrane of the larynx is subject to ulceration chiefly in a highly scrofulous constitution, (also in syphilis). The patient expectorates pus (we should rather say seems to do so, since its source is not in the lungs); in respiration there is a wheezing noise; the voice is husky, and in a whisper. I long since, in hospital reports, recommended the solution of nitrate of silver to be squeezed into the glottis, by means of a piece of sponge attached to a catheter wire. The late Mr. Vance adopted the practice. Tracheotomy may be required to save from instant suffocation; the cartilages become absolutely necrosed in the disease. Dr. Hunter narrated a case where the cricoid cartilage was split up. I have found one of the arytenoid cartilages hanging and vibrating in the passage.

If there should be hope of a cure, tracheotomy might relieve the motion of the parts, and procure rest.]

When I have performed laryngotomy for this disease, the relief has been only temporary.

[The operation may be required in croup. It was successfully performed on a boy of seven years by the late Mr. Chevalier. "About an ounce or more of frothy mucus gushed out through the opening." In my early days, I made the dissections for Dr. Cheyne's Dissertation on Croup. It will be seen, by perusing that work, that the child is sometimes choked by the membrane formed

by inflammation on the inside of the larynx and trachea. In a case by Mr. Blair, the operation appears to have been performed too late, the child dying of the secondary effects of the disease.

It does not appear that in these cases care was taken to keep the passage open until the breathing apparatus had perfect relief. They seem to have thought it sufficient to take away the concrete coagulable lymph.

The Operation of Tracheotomy.

The patient is upright in a chair; his chin is supported as far as he can permit, for he is momentarily in danger of suffocation. 1. An incision is made on the fore-part of the trachea, two inches in length; you permit it to bleed—which will tend to relieve him. 2. You proceed to dissect upon the fore part of the trachea: Leaving the isthmus of the thyroid gland at the upper part of your incision: you lay aside the thyroid veins; and you tie them if they continue to bleed. 3. You divide two rings of the trachea, and slit the intermediate membrane of the upper ring which is cut. This gives immediate relief, and the patient breathes freely.

[In this operation the position of the patient is awkward; his face is thrust forwards, and the muscles (sterno-hyoides and sterno-thyroides) start out whilst the trachea is pulled downwards and backwards, so that it is one inch deeper than your anatomical experience would lead you to believe. It is also alternately raised and drawn down.]

There may be a question about taking out a portion of the trachea.

[In this operation to relieve the breathing, the opening must be free. I am doubtful if the passing a canula through the nose into the larynx will be effectual. See Desault, *Œuvres Chirur.* tom. ii. Read Mr. Lawrence's cases, *Med. Chir. Trans.* vol. vi. Mr. L. takes away a portion of the trachea. My fear in that case is of granulations pressing in upon the calibre of the tube. He censures the use of an instrument which I used, but I used it only to hold aside the integuments.]

In Dr. Percival's case, the operation was performed too late, and I fear imperfectly. "He spoke with effort, and the tone of his voice was still that of a hoarse whisper." He should not have been capable of speaking at all, if the opening had been free. Dr. Farre's important paper on this subject is in the 4th vol. *Med. Chir. Trans.*: the operation too late, and the place of operation too near the seat of disease.]

Laryngotomy.

This is a much easier operation. It is called for suddenly when there is immediate danger of suffocation, from foreign bodies drawn into the windpipe or sticking in the pharynx.

[A child at play draws in with his breath a pebble or a stone of some fruit; and it may be that this body, fixing in the sacculus laryngis, or in the grasp of the glottis, the child is suddenly suffocated. Sometimes the paroxysm ceases, not by the expulsion of the foreign body, but by its being drawn deeper into the windpipe. Still the child is in imminent danger, since by a change of posture, or sudden exertion, the stone or pebble may be thrown again into the larynx, and again excite the spasmodic action of the glottis, and suffocation.]

Read M. Favier, Mém. de l'Acad. de Chirurg., for some curious experiments on dogs. Look to my paper on the action of the Trachea in the Phil. Trans.; my clinical lectures in the Med. Gazette.]

The operation of laryngotomy.—You have marked the relation of the parts; you have drawn your finger from the base of the os hyoides to the pomum adami; you have carried the finger still downwards, and marked the sinking in between the thyroid and cricoid cartilages. There is the point for which you have to aim.

The incision is very little lower than the pomum or projection of the thyroid cartilage. Having dissected down to and exposed the membrane in the free space just below the thyroid cartilage: you pierce the membrane with the knife, and introducing a small spatula, or the handle of the scalpel, and turning it round, you thus open the lips of the incision; immediately the patient breathes freely, the harsh sawing sound of difficult respiration is exchanged for the soft siffling sound through the wound.

[I have elsewhere narrated the case where my patient was so suddenly relieved, after three days and nights of suffering and exertion, that she fell asleep, and that so suddenly that I thought she had died !

Now, if the case is one where the stone sticks in the glottis, the probe should be introduced upwards, and the body shoved into the pharynx or mouth.

I do not foresee the necessity of slitting up the thyroid cartilage; it must greatly disturb the *cordæ vocales*. Desault slit up the thyroid cartilage; Bichat argues in its favour; Mr. S. Cooper describes the operation methodically. It is unnecessary in the case of a foreign body, and hurtful in the instance of disease. The cricoid cartilage being an entire ring, to cut it through would imply violence in opening it in an elderly person.

But if the body be not found there, it may be downwards in the narrow part of the trachea. On one occasion the operator, our house-surgeon, conceiving that he had done enough when he had thrust his probe from the incision into the pharynx, let the child die; and I found a pebble sticking in the tube within a quarter of an inch of the cut. I have had considerable difficulty in extricating half an almond-shell from the trachea. You should be there—

fore provided with small forceps and hooks, lest you may have to do something of this kind.

While Ferrand was surgeon to the Hôtel Dieu, a man was brought in with urgent symptoms of suffocation. Tracheotomy was performed, but only blood and mucus were discharged. He died. A piece of stone was found lodged in the sacculus.

It is one of the common instances of men writing surgery without experience, that you are told to make the child laugh to throw up the body from the trachea into the larynx. Why it is a great matter if you can get the child to be serious and quiet. But whilst it lies on a pillow, with a cut in its throat, it will be a difficult matter to make it laugh. However, before commencing your operation, you should try to discover by symptoms whether the foreign body lodges above or below your incision.]

There is another reason for early operations in all those cases, not yet noticed. The death from effusion on the lungs I had long since explained in lecture. But it appears that, after a seeming complete recovery, disease may be set up in the lungs; and that, at a more remote period, the patient may be lost by the consequences of the violent action during the paroxysms.

[*The subject continued under Wounds of the Throat.*]

§ 3. DISEASES OF THE RECTUM.

[In one sentence we may express the happy results of the peculiar sensibilities, and the appropriate muscular apparatus, at the lower extremity of the intestinal canal, by observing the consequences of an *anus* at the groin. The unhappy patient has not the discharge announced by any token. There is no provision of lymphatics to consolidate the motion. There is no receptacle to permit the *fæces* to lodge innocuous till a convenient season. Hence the unfortunate person had better cease to be. All this is provided for in the natural canal; and these provisions should be studied to learn how to treat affections of this region.]

Stricture of the Rectum and of the Anus.

I shall describe three conditions, all consequences of inflammation, however differently produced. The anus is subject to irritation and cutaneous inflammation, which at length produces stricture in the orifice itself. If it be our business to relieve pain, this is a matter of consequence, as I believe the pain is greater than from any other complaint. The effect is to produce chops and ulcers on the inside of the anus; and when the stool comes down, these tearing up, cause the patient to bellow with pain.

[In consultation with that most intelligent surgeon Mr. Copeland, he told me that one of his patients could so little contain himself during the agony of going to stool, that the watchman broke in,

conceiving murder to be committing in the house! Mr. Copeland's practice is to divide the mucous membrane for about an inch with the straight bistoury.]

The orifice being too small for the introduction of the finger, the straight probe-pointed bistoury is passed in about three quarters of an inch; the finger is forced in after it, by which the mucous membrane is divided in a direction towards the coxis. You need do no more but divide the mucous membrane: but do that effectually; the relief is inconceivable.

[The rationale of this operation is, that, by the division of the membrane, it yields to the pressure of the stool, by which the ulcers are no longer torn open, and they are permitted to heal. The opiate clyster, the anodyne ointment, the gradual dilatation by the bougie, are tedious and ineffectual means, compared with this touch of the bistoury.

It is truly surprising to find so much written on this subject by foreign authors, without ever touching the points of practice. For example, Richerand Nosographia.

The common Stricture of the Rectum.

The most common place of stricture in the rectum is about an inch and a quarter within the verge. It presents to the finger a circular membrane, perforated in the centre. There may be hardening and irregularity around it, but that is a secondary consequence of inflammation.

[The symptoms of stricture in the rectum are marked: 1. Constipation and irregularity, with the appearance of diarrhœa; 2. The fæces small and tape-like, or of an irregular shape; 3. Distention of the belly until painfully relieved at long intervals; 4. Flatulence and sickness. This condition may prevail until all the symptoms attributed to strangulated hernia show themselves.

A very natural question arises, Why is it that this stricture is found so constantly at a certain distance, viz. when the fore-finger is introduced past the first joint? Constipation is the cause; and by frequent urging of the bowels, or rather of the abdominal muscles, whilst there is no corresponding relaxation in the orifice, the inner mucous membrane of the rectum is protruded over the inner edge of the deeper sphincter ani; and this becoming habitual or frequent, an inflammatory action and consolidation is set up. When the stricture is formed, and the cause continuing, there arises, as I have said, hardness and irregularity around the stricture, and it becomes more complicated.]

Treatment.—The cure of this complaint is to be accomplished, 1, By regulation of the bowels, and thus removing the cause: by laxatives and enemata.¹

¹ The mildest laxatives are used; as milk, lime-water and manna; or sulphur with confec. sennæ and nitrate of potass.—the ol. ricini, &c.

[It will sometimes be necessary (and it is a delicate operation) to pass a small tube past the stricture, and inject, so as to dissolve the matter that lodges above.

The cure is to be accomplished by the use of the bougie. The rectum bougie is made of elastic gum, smooth, and a little conical; but it is not better suited for its purpose than a candle. Be in all those cases where you have to dilate, gentle in your operation. Violence does no good, for there comes on reaction; and remember that, with so seemingly harmless an instrument as this, you may bring on peritoneal inflammation.

It will be better to cut the stricture than to do violence by pushing a conical bougie. You take a straight bistoury, that has only a part of its edge sharp. You introduce your finger, and over it the bistoury laid flat on the finger. When the cutting part is within the stricture, the edge is turned up, and so you notch it first on one side, then on another; after which you resume the use of the bougie.]

Warts about the anus produce stricture. They narrow the orifice. They form within the orifice, keep up a discharge, and bleed with a formed stool. They arise from an acrid discharge, and that, I believe, from disordered function higher in the canal. Let this condition be distinguished from cancerous disease; it is a mere consequence of irritation.

[You snip them off, and use a strong solution of zinc as a wash, or liquor plumbi acetatis; and the citrine ointment, or the ungt. gallarum cum opio, introduced on the bougie.]

Scirrhus contracted Rectum

Is a more formidable disease. The extremity of the canal is studded with glands, and this is a carcinomatous disease of these glands. At once you infer its dangerous nature; and when the case presents to you, you have only to hope that it is not *the disease*, but an aggravated condition of stricture.

[The disease may begin in the anus or in the gut. The worst cases I have seen began in the side of the anus like a common pile; but it is hard and smooth towards the gut, becomes very painful, ulcerates and encroaches on the passage, producing the very worst form of

℞. Mannæ Opt.	℥i.
Ol. Ricini	℥iss.
Gum. Acaciæ	℥ii.
Spirit. Myristicæ	℥i.
Aquæ puræ	℥x. Ft. Mist.
Add Liquor Potassæ,	gtt. xii. (to make the ingredients unite.)

If more active medicines be required—

℞. Pulv. Cretæ cum Hydrarg.	gr. viii.
— Scammon. Co.	gr. x.
— Cinnamomi	gr. v. Ft. Pulv.

Aloes, they tell you irritates. Use the watery extract in combination. Aloes taken before dinner gives less irritation to the lower part of the canal.

stricture. It embraces the gut—destroys its dilatability—presents an ulcerated surface to the contents of the canal. Hence arises extraordinary pain, grievously aggravated by the passing of the motion; at last affecting the bladder by sympathy, and producing a necessity for the use of the catheter. At length the *fæces* are retained, the belly is tumid, the pulse intermits, there is hiccough, and all the symptoms which accompany the last stage of strangulated hernia.]

Treatment.—We can only soothe by obtaining easy motions; by leeching the hemorrhoidal vessels; by fomenting, by anodyne clysters and ointments.

[You foment by putting hay and poppies into the night stool, and pouring boiling water on them: over this the patient sits, to promote the bleeding, or merely to soothe. The clyster is intended to remain, and should be thrown up at night; for example, cold-drawn lintseed oil, with a grain of opium; or starch, or tepid milk with vinum opii.

In the last stage of the disease, I have afforded much relief by using an ivory tube, which, passing through the ulcerated part of the canal, allowed the contents of the intestine to be poured off without the severe spasm and pain which disturb the bladder and urethra.

In all severe complaints about the anus, remember the possibility of some indigestible matter lodging, and perhaps grasped, by the sphincter, as a bone or a pin, also recollect the case of “ball stool.”]

Obstruction higher in the Rectum.

In cases of obstinate constipation, there is a condition allied to stricture, which I do not find noticed.

The turn which the sigmoid flexure of the colon takes at the brim of the pelvis, is by straining pushed down upon the rectum; and the canal thereby takes so sudden a turn, that it is equivalent to a valve.

[I have had no dissection of stricture high in the rectum, and believe this condition of the gut to be in reality what is called a high stricture of the gut.

But, in these cases, you must sound when the obstruction is out of reach of the finger, for which purpose you are to use an ivory or silver ball on the end of a strong wire or rod of walebone; the rectum bougie being grasped by the anus, prevents you having the full use of it.

In sounding, or in introducing a bougie deep, you will not forget that the canal is a curve, and that many, by striking against the promontory of the sacrum, deceive themselves and patient with the notion of a stricture when there is no such thing.

The instrument is introduced for two inches direct, then pointed

towards the sacrum; and if further introduced, it must be directed forwards towards the centre of the brim of the pelvis.

If dilatation of a stricture is to be attempted deep in the rectum, it had better be done by introducing an intestine and distending it.

It has puzzled many to comprehend what service the bougie does when there is no stricture. The fact is, that it acts as a suppository, and brings on an action in the bowels; and this is the reason why old ladies in a town in the south, submit to the operation, insisting on the advantage obtained through the bougie!

Hemorrhoidal Tumours.

Hemorrhoids are tumours which cluster round the anus, a consequence of irritation at the extremity of the gut.

[*Mariscæ* are the tumours which come of old piles. (*Marisca*, a swollen fig. The term is in Juvenal.)]

Piles are very frequent, and require management.

[How ridiculous is the description of Baron Dupuytren!—The individual walks with pain in the street. We see him with his fingers at his fundament; or seating himself at the posts or curbstones, in order to press back the swelling; or rubbing himself against the wall; all which gives but momentary relief. He is weakened by hemorrhage—pale exsanguined—falls into melancholy—becomes weak in faculties—finally, there is a scirrhus affection of the anus, and death! This is downright confusion and nonsense; a picture quite overcharged. The complaint is quite within your power to cure.]

A pile results from distention of the veins of the anus. The distention produces inflammation, and the deposit of coagulable lymph around the vein; so that in time there is an excrescence organised, and with a distended vein within it. It presents a dark blue elastic tumour. The extremity of the vein bursts and bleeds. When first formed, the tumour is round, vascular, and painful; it fades, or becomes less painful. Another attack brings down or forms another pile; so that at length there is a cluster of them, generally with one more sensible than the others, and from which the distress and inconvenience principally proceeds, “the master pile.” The more aggravated condition is when they enlarge so as to drag down the inner coat of the rectum, and become large and ulcerated.

There are internal and external piles; the internal consisting of dilated veins, the mouths of which open upon the interior of the gut, and bleed.

Constipation is the cause, but *purgings* are not cure. Straining brings on the complaint and increases it.

[Thus is stricture of the urethra often the forerunner of piles, because the stricture occasions straining to pass water; and often you will have some difficulty to determine whether the disorder of the anus arises from the state of the urethra, or the disturbed bladder from the piles. The sympathy of the parts is intimate.

Purging and tenesmus will produce piles, because of the relaxation of the sphincter, and the urging from above; and thus the sphincter contracting spasmodically on the protruded part, distends the veins more.

It is in this way that you have to explain the occurrence of blood continually spurted against the night-stool or water-closet. The veins being beyond the sphincter, it closes on them, and forces the blood to burst forcibly from them.]

Piles thus formed are attended with many unpleasant symptoms. There is great pain, from which they get their name, and a weakening discharge of blood. Their surfaces become ulcerated, and there is irritation, accompanied with swelling of the glands of the groin, pains in the sacrum, and down the thigh.

Treatment.—The cause being in the irregular condition of the digestion and discharges, these are to be first attended to, and mild laxatives and clysters so employed as to prevent all farther source of irritation. They are to be leeches and fomented if in a violent state of inflammation; and sometimes they are relieved by the point of the lancet. When in a lesser degree of inflammation, the ulcerated surface should be touched with a powder of nitrate of silver and gum-arabic, or touched with the painting brush and a solution of the caustic. Dipping a dossil of lint in a decoction of galls and laudanum, they are to be compressed gently, and kept reduced with this and a bandage.

But old confirmed piles with *mariscæ* must be taken away. When taken away, however, in patients of a certain age, and who have long had a habitual discharge of blood from the anus, there is some danger in their sudden suppression. Leeches to the hemorrhoidal vessels, and some change in diet, are implied. If piles have connection with disorder of liver, the course of treatment is suggested.

[Some will cut them off at once and no more ado. The inconvenience of this is, that after a day of professional labour, you are suddenly called up and told that your patient has fainted on going to stool, and has lost an extraordinary quantity of blood. Again, to avoid this, other surgeons tie the piles. Now, it happens that the skin of the anus being drawn in by the swelling of the tumour, the pain is excessive; and the bladder sympathising, the catheter is required.

Both these consequences may be easily avoided. Prepare the patient by clearing out the canal; let him have a lavement in the morning of the operation; a small irritable projecting pile may be cut off without ceremony, but a large pile with a broad base may be treated in this manner: Take a silver pin, a little longer than that used for harelip; take hold of the base of the tumour between the thumb and finger; pass the needle across the base of the pile; snip off the pile with the curved scissors, leaving the needle, and let the surface bleed, fomenting the while. This loss of blood is a great relief, and prevents inflammation. Take a soft ligature and

put it round the needle, and draw it just to a degree to close the vein. This is for the purpose of preventing the great loss of blood which will sometimes attend a call to the water-closet. Next morning the silver pin or wire is withdrawn.

I was in the use of throwing up a few ounces of starch with twenty drops of laudanum after the operation, to keep the parts quiet for twelve hours. This is a mild and effectual mode of proceeding. But let us hear how M. Dupuytren proceeds. Of the application of the actual cautery, he says truly—"The cautery has something frightful to the spectator. I have seen you shudder at the red-hot iron and the smoke from the anus! Judge, then, what it must be to the friends in private—the parents not accustomed as you are to such pictures!" It is indeed a picture into which should be introduced the familiars of the Inquisition. We should suppose from this passage that he condemns the practice; but, no—he is fortifying the minds of the elites, and of our young gentlemen who go to the hospitals of Paris to learn the practice of surgery.]

The internal pile requires some consideration.

There is a soft tumour which grows from within, and which may be treated with the ligature. This tumour, by coming down upon the anus, and irritating like the presence of matter, teases; besides it bleeds, and keeps the person uncomfortable. The patient's bowels being cleared, you make him strain over warm water to bring down the tumour, when you pass the tenaculum across it, and throw a ligature over it; tie it firmly, and reduce it. This is not like the external pile in firmness, and there is no danger of the membrane of the gut being drawn in by the swelling of the tumour; it is generally as soft as a strawberry. If it be of any size the needle may be passed through its base. The needle cut off and two ligatures thus formed, they may be tied, the one on one side, the other on the other, of the base of the tumour.

[When treated in this way, it will be proper to snip off the greater part of the tumour. By opening it or cutting it off, the danger of its remaining alive, notwithstanding the ligature, and swelling under its embrace, is removed.

These excrescences hardly deserve the name of tumour; they tend to no bad consequence when the cause of them, which is irritation, is taken away.]

The French authority above quoted, after describing the pain and danger of the ligature, proceeds to advise the cutting off of the tumour, and the application of the actual cautery to hemorrhoidal tumours.

["When the pile is external, the blood is thrown outwards; you see it, and easily stop it by the cautery. As to the internal, the symptoms declare the bleeding. (Pray observe what these *symptoms* are.) A sensation of heat in the belly, which mounts higher and higher, in proportion as the blood accumulates and fills the intestine. Then he has colic pain, with a peculiar sensation, and tenesmus—there is especially pain in the flanks and iliac fossæ; the

respiration becomes painful and cut (entercoupié); the pulse irregular, intermitting, small, and frequent; the skin discoloured, with a cold sweat, and in the face despair; followed by vomiting, convulsion, and vertigo!!!

Such is the condition described in Dupuytren's clinical lectures, of the patient in the case when the cautery has not been effectually applied. He has not the most distant conception of this being a disgrace to the profession of surgery. The quantity of blood lost in the operation amounts to three, four, or five pounds. It has filled the descending colon—the transverse—and the ascending colon to the cæcum; but it does not pass that. How do they know? By dissection!]

I notice this, because it is a consequence of those desperate operations, followed by hemorrhage, which some surgeons conceived themselves authorised to perform, on a wrong principle, or rather on no principle at all.

[Read the first case, p. 177, tome i., of the *Leçons Orales* of M. Dupuytren.]

So some men, in imitation of such authorities, extirpate the anus!

[I can only express my opinion: If there be diseases of a malignant nature, they cannot be extirpated; the surrounding parts and lymphatic glands are necessarily contaminated. If irritation and the action of the part have excited to excrescence and irregular thickening, partial excision, the removal of warty excrescences, followed by the obvious means of soothing the action and the surface, is the practice to be followed.

In bleeding from within the anus, you may use a clyster of cold water. It is recommended to introduce a hog's bladder, and to stuff it with lint. In such cases, the bladder is not the best surface to be put in contact with a bleeding surface. Lay a picce of fine cloth, or a cambric handkerchief, over the anus, and push in dossils of lint until there is a bag within the sphincter thus filled. On drawing down the cloth the vessel will be compressed. If this be not effectual you must make the patient strain until the bleeding orifice is exposed, and use the common needle as formerly described, which is better than the actual cautery. Having a thread in the eye of the needle, it is easily withdrawn. A bit of bougie or of lint put upon the point of the needle prevents it pricking; but this is not necessary.]

When danger arises after any severe operation on the rectum, what should alarm me? "Pain above the pubis, and towards the umbilicus; then fever and peritoneal inflammation indicated by tenderness."

[The question reminds me of warning you against the use of the *speculum ani*, or of forcing a large bougie into the rectum, for inflammation of the peritoneum results, and death. In operations on the rectum there is less pain on injuring the gut within than at

the margin; *but the danger of peritoneal inflammation is greater the deeper the injury.*]

Prolapsus Ani.

The descent of the gut is frequent in children. It is not from fulness, as some have conceived, but from a peculiarity which you should observe for many reasons—an extreme irritability in the bowels of children. Sometimes ascarides will produce it; so will stone in the bladder. Often acidity and purging produce it.

[I have seen, on dissection, in the course of the canal of an infant, three different portions of the canal in a state of intus-susception. The prolapsus and intus-susception are nearly allied; both are consequent on local irritation.]

In adults it is a more formidable complaint, and may pass on to complete strangulation. The pain becomes severe; the spasm uncontrollable; the portion already down, dark, and surcharged with blood, rolls out to a greater extent. The sphincter contracts upon this mass, and all the effects of strangulation are produced. There arises peritoneal inflammation and the patient is lost.

In the child the case is more manageable. Let a sponge of the natural warmth of the body be held to the part. Oil your fingers: form a piece of paper into a conical form; soften its point, and oil it. You commence your operation by a general gentle and equable compression of the mass. You then introduce the part which came last down: and so carefully bit by bit you diminish its volume. You find that it is brought down by the withdrawing of the fingers. You therefore take the conical piece of paper, and applying it, you reduce the last portion. The cone slips easily away, without drawing the gut with it; and you hold the nates together, which keeps the bowel up. An anodyne clyster will soothe the part, and tend to prevent the bowel from being immediately thrust down again. Astringent lotions may be necessary; (and if ascarides have been the cause, injections to destroy them are to be used—aloes in milk, turpentine beat up with egg, weak solution of sulphate of iron, &c.) Probably the pulv. sodæ cum hydrarg. in small doses, with the infusion of cascarrilla, or of cusparia with soda, will suit the disturbed condition of the intestinal canal.

In adults the care must be, by uniform pressure, to counteract the force from within. It is the escape from pressure, and the sudden extravasation into the cellular membrane of the inverted gut that endangers strangulation.

I have had thoughts of dividing the sphincter in formidable cases.

[There is an instrument for supporting the relaxed anus.]

Fistula in Ano.

Whatever may be the cause of irritation in the rectum, piles,

ulceration, stricture, or prolapsus when inflammation exists within, there is danger of abscess in the cellular membrane external to the gut. The cause, however, is forgotten, and a painful swelling appears by the side of the anus, attended with pain in going to stool, and perhaps difficulty of passing urine.

[Mild laxatives, clysters, leeches, and fomentation, are employed; but of all things, see that you use your lancet early, so that the matter may not burrow deep.

Consider the case, and distinguish between the abscess from inflammation of the urethra and that connected with the rectum.

In elderly gentlemen with exhausted constitution, the abscess may have little to do with the gut, and be of the nature of carbuncle; so far at least as to require especial attention to the constitution, as well as stimulating fomentations to the part.

Consider also the possibility of this abscess being "in the part and not of it; that is, that, being of the nature of chronic abscess, the matter may have descended, and that you have to do with a lumbar abscess, instead of a suppuration from local irritation.]

Such an abscess as we have described being opened, and the urgent symptoms relieved, becomes first a sinus, and then a true fistula, that is, a sinus communicating with the rectum.

The abscess may have communicated with the rectum before opening externally on the integument; and it may remain for some time discharging pus as the stools are evacuated.

[Thus systematic authors make distinctions into external, internal, and perfect fistula; meaning by the last term to indicate the case where there is both an internal and external opening.]

Matters do not always remain thus, if the complaint be neglected; the contents of the rectum getting into the fistula, new inflammations, and consequent suppurations, are set up, attended with fever and great distress; and the buttocks may in this manner be quite undermined with sinuses, and these extending far from the anus.

In some constitutions the opening is extensive, and a pale striated ulceration is disclosed, quite indolent, and very difficult to excite into healthy action; and this, of course, is a result of an impoverished and exhausted constitution.

[*Treatment.*—When a fistula in ano is of long standing, without much inflammation, and little distress, and the patient is delicate and subject to cough, do nothing with the idea of curing the disease; limit your attention to regulate the bowels, to free the rectum from accumulation of matter, and to soothe the parts. The rectum bougie may be regularly passed.

When the sinuses have run extensively under the integuments of the buttocks, do not attempt to cure at once, for the incisions may be too severe: but open the sinuses towards the gut, give freedom to the discharge there, and consolidate the remote passages. After this, when the complaint is in a manner limited to the simple though "perfect" fistula, perform the operation.

Introduce your probe, bending it and adapting it to the sinuosi-

ties, until you think you must at least be touching the rectum. Then, having your finger oiled, introduce it into the rectum, and now endeavour to bring the point of the probe in contact with the finger. This, probably, you will not be able to do at once; but you feel that there is a very thin membrane only between the probe and the finger.

You seek for the communication between the fistula and the gut at the upper edge of the internal sphincter, and there it will be, if not superficial, and just within the margin of the external sphincter. Having found it, and passed the probe into the gut, the remaining process is easy. Pass the bistoury along the probe, rest the point upon the finger, and pressing the handle against the nates, give the point a direction outward, and bring out the finger and bistoury together, cutting the substance between the cavity of the canal and the cavity of the fistula.

If the object of laying the fistula and the canal into one be accomplished, little more is to be done; you lay a piece of oiled lint between the lips of the wound, and apply a warm sponge or fomentation.

This operation in woman requires other precautions; you must not divide the sphincter towards the vagina.

How high may the operator go with his incision of the rectum? It is needless to go higher than the sphincter, for it is the sphincter which prevents the fistula from healing.]

When it appears that the connection between the fistula and gut is so deep that hemorrhage might result, I advise you to use the ligature, in order to divide the higher part of the septum, and when this is done, to divide the margin of the anus with the bistoury.

[The operation with the ligature is this: You take a leaden probe, with an eye carrying a firm waxed ligature; you pass the point of the probe in the manner described through the intricacies of the fistula, and into the gut; you pass your forefinger into the anus, and with the lith of the last joint you take hold of the end of the probe; you may be enabled to bring it out, or you only bend it, and afterwards seize it with the forceps. Thus you draw through the ligature; then having had a compress prepared, you lay that on the integuments between the margin of the anus and the orifice of the fistula, and over the compress you tie your ligature with a slip knot. The intention of the slip knot is, that from time to time, as the ligature gets loose, it may be drawn tighter. The action of the ligature is upon the edge of the septum internally. Very gradually, by ulceration, it makes its way downwards, and happily the communication is filling up behind.

There is little inconvenience in this mode of operating, and no pain, till you come to draw it on the external skin; then there is pain and inflammation; and now, if the patient will permit the knife at all, with one motion of the bistoury the remaining integument is cut through,

The operation may be done with a leaden wire; twisting the wire instead of drawing the ligature from time to time.

Let the dressing be very simple; no stuffing.]

Imperforate anus.—A child is born imperfect in this part. Often there is no rectum, and the intestines terminate in a cul de sac. The child lives whilst this sac is acquiring extraordinary size, then dwindles and dies.

Sometimes the anus is formed; the sphincter is there, and the circle or margin sufficiently well marked. The rectum is entire, and the fæces filling it almost protrude the integument in this case. The *anus* may be perforated with advantage; but I have given up hopes when we have to search for the rectum.

I can only advise that the anus be perforated to the depth of three quarters of an inch, and the portion of an urethra bougie inserted. Ulceration, and the pressure from above may do the rest. But if you succeed in procuring the evacuation of feculent matter, the child must have a miserable existence.

CHAPTER XX.

THE DISEASES OF THE URETHRA AND BLADDER, AND THE OPERATIONS PERFORMED FOR THEIR RELIEF.

[The author published a book on this subject, a second edition of which appeared in 1820; also plates in illustration of the morbid appearances of the urethra and bladder. He will endeavour to make it unnecessary for the reader to have reference to his former work. At the same time, notions then prevailed, which he hopes he there successfully combated. The dangerous authority of Sir Everard Home universally prevailed.]

Before advancing to this department of practice, I entreat you to make yourself master of the relative position of the parts as seen in the section of the male pelvis; and that you trace the membrane of the urethra from one extremity to the other.

[You may read Duran, Sharpe, Chopart, Desault, Hunter, Home, Whately, &c. &c.]

Of pain and irritation felt in the Bladder, Urethra, and Perineum, not really seated there, but proceeding from disorder of the Bowels.

[Those sympathetic pains which seem to affect the urinary organs, and which have their real seat in irritation of the rectum, or the other intestines, bring full one half of those patients to the surgeon, who are considered as labouring under stricture of the ure-

thra. That this subject should make no part of those numerous treatises on stricture we possess, is to be explained only by supposing that experience follows, and does not precede, those publications. It is a fact that ought never to be absent from the surgeon's consideration, when a patient presents himself, complaining of frequent micturition, pain in the bladder, and pain in the perineum, that these symptoms very frequently depend, neither on stone, nor stricture, nor inflammation, nor any mischief in these parts, but on remote irritation. If the practitioner does not carefully distinguish these cases, he will become a party to the patient's fears and misconceptions, and expose himself, in the end, to the supposition of being either very ignorant of the matter, or guilty of a still worse fault. Were it not owing to the remarkable neglect of nervous sympathies which prevails, indeed I may say, without reservation, were it not to be attributed to the neglect of this part of pathology, I should have cases, not of mistakes, but of selfishness and dishonesty to detail. The fact is simply this, that I have received patients, after having used bougies for months, nay years, who had no other complaint than an habitual disorder of their large intestines. There are two classes of gentlemen who will know how to appreciate these remarks; those who have had much experience in diseases of the viscera of the pelvis; and those who have attended my demonstrations of the nerves of the pelvis, the hips, loins, and thigh.

Therefore I conceive that the reader, having perused the many cases of long suffering from organic disease to be found in the course of the present work, must feel relieved, on knowing that our worst apprehensions from pain and spasm in the bladder and urethra, are very often occasioned by intestinal irritation, instead of stone or stricture. Mistakes about this matter are continually occurring, and the distress of mind which they occasion, as well as the severe and hurtful practice which is too frequently the consequence, give it a strong claim upon our attention. At one time we find the patient living an indolent life, and thereby hurting his health, lest by a sudden motion he should displace a stone in his bladder; at another, irritation and strange feelings in the perineum lead the patient to believe that he has stricture. In the one case the person is exhausted by the harassment of this imaginary evil, and his health disturbed by the confinement and want of exercise. In the other case, it is still worse, since the irritation in the urethra draws the patient to a surgeon; he introduces a bougie, and as this usually gives relief, it is repeated until some mischief is actually the consequence. Very often there is slight abrasion of the membrane by the unskilful use of the bougie, which, were it not for the frequent repetition, would soon heal; but by a perseverance in a wrong practice, it becomes the source of pain and discharge.

Mr. A. returned from Bengal in June. He complained of pain and irritation at the neck of the bladder, and discharge from the urethra, heat in making urine, and a frequent call to void it. He showed me various bougies, and a catheter which he had been in

the habit of using regularly since the time of his embarkation. And he farther informed me, that the instrument was interrupted near what he supposed to be the neck of the bladder. On introducing one of his bougies, and in the manner in which he said he was in the habit of doing it, I found that it passed without obstruction along the whole of that part of the canal where stricture is usually found. But when, by calculation, the point had gone through the membranous part of the urethra, and was about to enter the neck of the bladder, it was entangled, and on pressing it forward it gave pain. I desisted that day, but on the succeeding one, taking a large wax bougie, and turning the point up, I passed it quite into the bladder. The extremity started over some obstruction; but when home into the bladder, it was not grasped: the obstruction was not therefore of the nature of stricture.

This gentleman having originally the symptoms of stricture in the urethra, had been treated with the bougie, and a lodgment made betwixt the cords which are around the caput gallinaginis; and hence arose a new source of uneasiness, and of inflammation and discharge.

Since this case was first published, I have had a very extraordinary confirmation of the truth of these remarks. After I had dismissed this gentleman, entirely relieved from his complaint, when travelling on the Continent, he was seized so suddenly with obstruction in the urethra, that he sought relief, and had the lunar caustic applied to his urethra several times. He wrote to me, expressing his gratitude to his surgeon; and that, still feeling uneasiness, he would return home if I desired that he should. I recommended him by all means to continue his tour into Holland, and promised him that when he returned home I would pass the largest bougie into his bladder, and satisfy him on that head. This was a bold promise, since caustic will make strictures where there are none. Some time after, he returned home. I passed a full-sized bougie into his bladder, without giving him pain. He was surprised; but what signifies the surprise, and of what value is the gratitude of one entirely deceived by his own morbid sensations; who can make no estimation of his surgeon, whether he dismisses him honestly, or continues to attend him *kindly*!—Such cases are very common, and very provoking to witness. I had lately a young gentleman from the army of occupation, who had furnished his purse, obtained his leave, and engaged lodgings near me, and then presented himself to be cured, he said, of a confirmed stricture. He had long been exercising his ingenuity to destroy it, but finding that the symptoms did not abate, he came to town, resolved to sit down to a regular attack upon it. Somebody had given him a beginning, by hurting the membrane of the urethra, near the curve, with the end of the bougie, and he by successive injuries had prevented this breach healing. All that was required was to allow the parts rest, and to manage the bowels, which were the cause of the original irritation,

There is a certain class of patients, for which those surgeons who may not inaptly, however vulgarly, be said to have a run of business, find no time or patience: their complaints are called imaginary. The surgeon is vexed with the obscurity of symptoms, and with a long history in strong language, expressive of that distress which it is difficult to comprehend.

A patient came to me after having been under the care of four surgeons successively, for the cure of stricture in the urethra. I found his chief complaint to be an excessive tenderness in the perineum, so that as he walked across the room he lifted his leg with an awkward and straddling gait, afraid to bring his thighs together. He told me that he had commanded a corps of yeomanry cavalry, had been an active magistrate and a great fox-hunter; but that for a long time he had not been able to mount a horse. He had been obliged to have the seat of his carriage made with a hole answering to his perineum, and had taken every precaution to prevent pressure against that part. I introduced a bougie into the urethra, but found no obstruction nor any unusual tenderness in the passage. I examined him also per anum. It was remarkable, that, in putting him in the posture of lithotomy, and in fingering, kneading, and pressing the perineum, he was not sensible to pain, although when he arose to walk, his progression was as before, in the same singularly cautious manner, betraying the utmost anxiety, that not even the clothes should touch the perineum. I was by this confirmed in my opinion, that it was a pain referable to the perineum, but not actually seated there. By attention to the bowels, he was relieved, so as to resume his horse exercise, and venture into the country.

A professional gentleman suffered much uneasiness of mind from a pain in the bladder, accompanied with frequent desire to make water, and an increase of pain on voiding it. He took alarm about stone in the bladder, because the pain was especially severe when the bladder was empty. In the commencement of the attack he suffered indescribable irritation, extending over his whole body, and beginning at the lower part of the belly. It was with difficulty he could command his temper when in this state. These symptoms were particularly apt to come on when he lay down in bed; but he could not discover whether this was owing to the influence of the cold sheets upon his skin, to the change of posture, or the emptying of the bladder before going into bed. The first attack continued only during one day and night; but from time to time these disagreeable symptoms returned; and during their continuance he found it quite impossible to dismiss uneasy reflections from his mind. At length the pain became more severe and continued, but happily at the same time he was convinced that the whole depended on the state of his bowels. For being urged to consider, if there was not something in his diet which lodged and irritated the intestinal canal; his suspicion fell on a most preposterous indulgence in figs and Spanish white wine at supper for several successive nights. By clearing out the canal, avoiding indigestible matters, and by the use

of a mild laxative, the complaint entirely ceased. The singular circumstance here was the severity of the pain, apparently fixed and local, and the distinct sensation of tenderness in the neck of the bladder, although certainly there was no actual disease there.

I have frequently removed complaints falsely attributed to stricture, as well as the aggravation of the proper symptoms attending such obstructions, by dislodging scybalæ from the colon and rectum. There is an old patient of mine, who, when distressed in this manner with pain in making water, can ascertain, by his finger in ano, that it proceeds from hardened fæces there; and by a clyster of warm water and soap he removes the pain. To exhibit these symptoms in another point, I have prevailed on a patient to make his own statement: it is to the following effect:—

“The attack does not come on except when I am a little out of health, and when, by confinement to the house, the bowels have become torpid. Though there be no pain before going to stool, still there is a certain sensation before sitting down, which warns me that I am to have an attack. It is after passing the fæces, that there is a sudden sensation of pain within the anus, and at the neck of the bladder. This is immediately followed by a pain, as of a sharp instrument driven from behind along the urethra, and giving the glans repeated darts. There follows this an intolerable spasm; being an attempt to pass more urine. These symptoms are not relieved until I bathe or foment all the parts thereabout with warm water. The attack not only returns on the occasion I have mentioned, but also frequently comes on when I am sitting in my chair; and even after I have been so well as to venture on horseback, it will come on suddenly, and with great violence. The principal distress, then, is lancing pains along the urethra, with great irritation of the bladder.

“Considering this as inflammation of the bladder, I abstained from wine, until one day being in a large company, and suffering very severely, I in despair took several glasses of port wine, which not only soothed me at this time, but made me much better the next day. After this, I found myself always better on taking a few glasses of port wine. Purges increased the irritation. The medicine which has done me the most good is the balsam of copaiba, which acts as a gentle laxative. Though quickly removed by attention to the bowels, the attack is very apt to return.”

When thinking of this subject, I had a visit of an old patient, who is occasionally disturbed in nearly the same manner. But in him were contrasted the disease actually seated in these parts, and the sympathetic affection from irritation of the intestinal canal. Some years ago, being in Ireland, he had a gonorrhœa, and during the inflammatory stage his surgeon used a large bougie to remove the discharge. To this treatment he attributed an excess of suffering and inflammation in the neck of the bladder which kept him long on his back. When he came over here, he still complained of pain in making water, and had a frequent desire to void it; and especially

the pain was great in discharging the last drops of urine. On account of these symptoms, I was called in to sound him for the stone. He had very naturally a great dread of the operation ; for he thought it must occasion a return of all his sufferings. No stone was felt. Next visit I examined the prostate, and found it enlarged on one side, and painful to the touch.

For the removal of these symptoms he took a pill of cicuta and calomel every night ; every three days he had leeches applied to the verge of the anus, and rubbed upon the anterior part of the rectum an ointment with camphor and mercury : and as the bougie was found to relieve the distressing symptoms, it was introduced for ten minutes twice a week. Under this treatment he got rapidly better, and the more formidable train of symptoms never returned. These complaints were indeed in contrast with others, in themselves sufficiently distressing. 'There came upon him from time to time, a pain at the lower part of the belly and behind the pubes, attended with great irritation in his bladder, with spasms, and a stinging along the urethra. 'These I traced to irregularities of diet, and to the congestion of matter in his bowels. In conversation he observed, "that abroad we were not accustomed to sit after dinner as you do here, which if I am constrained to do, this irritation comes on ; and if I ask a lady to drink wine, the wine is no sooner in my stomach than the irritation of my bladder commences : if I am long confined to the room, it rises to a dreadful degree of annoyance ; but if I am free to leave the company, especially if I mount my horse, which I am in the habit of doing abroad, I prevent its occurrence, or am presently relieved, if it has begun." This gentleman was at length cured of all his complaints by due attention to his bowels.

But this is not the whole of the case. Since the last publication of these remarks, this gentleman being at Paris, introduced himself to M. Cullerier, to have a thorough search for a stone in his bladder. That gentleman sounded him, and turned him about in all manner of postures, but found no stone. After a mission of two years in a foreign country, he came again under my care. And I shall venture to predict, that whenever out of health, or with derangement in the bowels, he will have his old apprehensions ; for, when actually suffering this kind of irritation, it is impossible for the patient to dismiss his fears.

Such are among the most common occurrences in general practice. They are in themselves trifling complaints, but in their consequences very serious, from the mistakes into which they lead the surgeon ; and the patient, in these circumstances, is always ready of belief.

I have affirmed, that there never occurs a proper stricture, posterior to the internal fascia of the perineum. But the inflammation to which the parts behind are peculiarly exposed, very often gives rise to the symptoms which are readily attributed to stricture—these parts are *Cowper's gland*, the *sinus pocularis*, the *prostate gland*, and the *vesiculæ seminales*. There are men whose hourly busi-

ness is poking into this passage with bougies, who, if they have heard the names, know neither the place nor diseases of these parts, and sometimes by forcing what they consider a stricture, they rupture the membrane, and enter their instrument into the substance of the prostate, or fix it in the sinus of the seminal caruncle.

Col. G. returned from India with health very much impaired, and with symptoms of what he thought stricture in the urethra. He went to a surgeon who told him that he had only a very slight stricture, and that he would destroy it by one introduction of the bougie. He introduced a large wax bougie: it gave exquisite pain, and when withdrawn, it was doubled at the point; and the blood came out in jets from the end of the urethra. After this operation, the patient had no rest for many months. He next went to a surgeon, who also treated him with bougies, and under whom he was nearly two years.

When the time of his return to India drew near, he became excessively anxious, for still the introduction of the bougie was thought necessary; and every time it was introduced, with whatever degree of care, it drew blood. At this time I sounded him, and passed a large bougie along the whole urethra without giving him pain; but when the extremity of the instrument was pushed through the prostate gland, and over the seminal caruncle, there was an insufferable pain excited, and he became very faint. It was evident that he had no stricture. On further questioning him as to the size of the bougie, and the marks which might have been upon it on former trials, he told me the bougies had always been brought out as easily as this last one, and without any mark upon them. As the bougies had always been brought out easily, and without being grasped, although it appeared that they had remained long in the passage, and as they had exhibited no nip nor mark of stricture, I could not resist the belief that there had never been a stricture, although he had been treated for it upwards of two years! I need not add that I put this patient upon a very different plan. It was my object to soothe the complaint of the viscera to which he was subject, to attend to the secretions from the intestines, and to see that they were in due quantity, for his liver was out of order; and in the mean time to relieve the inflammation of the neck of the bladder from the injury it had suffered from the frequent and needless introduction of bougies.

This gentleman, on a voyage from Madras to China, passed a large fish-hook from his rectum!! he could not tell how it came there.

By disturbance in the bowels, a train of symptoms are produced which are attributed to disease of the urethra. It requires the patient to have a strong mind or very implicit confidence in his surgeon, to be enabled to dismiss his apprehensions of stone or stricture.

How those sympathies take place which give rise to these consequences, it were quite needless to attempt explaining, unless my reader had accompanied me in the demonstration of the visceral

nerves. It is sufficient for practical purposes, at present, to observe, that there is not only a sympathy betwixt the bladder, and the other parts contained within the pelvis, by which the diseases of the one may be mistaken for those of the other; but certain parts of the intestinal canal through its whole extent, sometimes the stomach, sometimes the ileon, often the colon, and still oftener the rectum, being the seat of irritation, will produce sensations in the bladder, the perineum, or urethra. These will fill the mind of the sufferer with the most serious apprehensions, and lay him open to the mistakes of ignorance. With regard to the external pains which accompany these internal irritations, they will in general be attended with a sort of scalding or sensation of heat upon the skin; and if the patient be capable of attending to the circumstance, the pain will be found to correspond to the progress of indigested food or acrid matter along the canal. The pain, for example, will often precede the call to stool, and be relieved as soon as a different sensation is experienced.

What I have done in these cases is soon told—to enter fully into the subject would be to usurp the physician's province.

The violent operation of purgatives is to be avoided. The combination of laxatives is better: thus, after emptying the canal, with the *oleum ricini* and *tinctura sennæ*, preserve the intestinal surface in activity by combinations of *ipecacuanha*, *pulvis rhei*, and *pulvis cretæ cum opio*; or a combination of the *pulvis antimonialis* with the *pulvis rhei*, and the *extractum papaveris albi*; or, it may be, that it will suit better to give the *electuarium sennæ* with sulphur, or sharpened by the addition of *jalap* and *oleum ricini*. It may be necessary to combine opium with the *oleum ricini*, when there is much pain and spasm, or to add *hyoscyamus* to a pill of soap and extract of *colocynth*. Superior to all, in some constitutions, is a teaspoonful or two teaspoonfuls of the balsam of *copaiba* taken at night. When by such means the canal is disposed to a gentle action, let the morning evacuation be assisted by a larger clyster of warm water. Very often, in these conditions of the viscera, there is only something wrong in the diet, and the symptoms will vanish by avoiding what harbours and is offensive. We shall find it often impossible to restore to the bowels their permanent healthy action, without stirring up the liver to its office. What I have found of most advantage, is a pill at night of three grains of the *pil. hydrargyri*, and two grains of the compound extract of *colocynth*, and in the morning the patient may take a very small portion of neutral salts in solution so as still to avoid purging, but only gently and regularly to move the intestines, or the carbonate of soda, and tartrate of soda in a state of effervescence with the citric acid.

If mistakes have been committed with instruments, it will be well to apply leeches to the verge of the anus, and soothe by bathing and fomentations, by drinking mucilaginous decoctions, or by taking occasionally a mucilaginous electuary, or a teaspoonful of Hoffman's anodyne in almond emulsion.

Clysters of warm water, during the paroxysm, are very soothing, and go directly to the seat of the irritation. The clyster of cold water is often advantageous. The anodyne clyster of starch, or milk with tincture of opium, or the opiate suppository, will naturally be suggested in the violence of the paroxysm. But a regulated diet, air, and exercise, are here, as in many complaints, the most natural, the most obvious, and the best means of cure.]

The cases which require the Catheter, and of the introduction of the Catheter.

In paraplegia, and in fracture of the spine, the urine is retained in the bladder; there is no power of expelling it.

[You will be told of some undefined influence of nerves withdrawn, which makes a change upon the secretion, and causes the urine to become irritating to the bladder. This is fancy; there is no power over the secreting organs withdrawn by division of nerves. Let me remind you that the patient has no sensibility in this case in the passage. The more occasion have you to be careful in using an instrument. Although he feels not yet the injury done with the catheter, it brings on mucous secretion, and inflammation and fever, just as certainly as if, by your awkwardness, you had made your patient cry!]

In these cases of paralysis, the bladder becomes surcharged, and then the urine drains off. But inflammation may notwithstanding arise from the distention.

Whatever disturbs the muscles which surround the neck of the bladder, stops the action of the detrusor vesicæ, and the urine is as effectually retained as if some mechanical obstruction existed.

[Thus, 1. operations on the rectum; 2. a kick or a fall on the perineum; 3. fracture of the os pubis; 4. extravasation of blood; inflammation of urethra, &c. are attended with distention of the bladder.

Thus, too, in the case of gonorrhœa, when that inflammation is propagated backward to the sinus urethræ, it happens that the acrid urine stimulates this portion of the urethra; the ejaculator seminis which surrounds it is excited, the urine is squirted out in painful jets; and presently the other sphincter muscles sympathise; they are spasmodically affected, and the muscular coat of the bladder (their natural opponent) ceases to act, and there is complete obstruction.

So it happens, that when by any circumstance the bladder becomes inordinately distended, the urine ceases to flow until at length it dribbles away, and the patient believes that he has an incontinence of urine instead of obstruction. This is the case of *stillicidium urinæ*. So it occurs that a man with a full bladder, being long detained by false modesty, when relieved from restraint, cannot pass a drop of urine! See the case by old Ambrose Paré,

of the young bachelor who had his mistress on horseback behind him. So the famous Tycho Brahe in Hildanus.

The most unequivocal example is in woman: although in her the muscles be fewer, yet there is the same relation in them for expelling and for retaining the urine; and when these relations are disturbed, the urine is retained in the bladder—*e. g.* a woman being in labour, and the child's head pressing the urethra, and the labour in this stage delayed, when at length delivery is accomplished the bladder refuses to act! The case being misunderstood, and the woman's condition neglected when the practitioner returns, he feels the abdomen distended, and the bladder filling it as the uterus did before!

I state these cases in the beginning, that you may comprehend how easily the muscular apparatus round the urethra and neck of the bladder is disturbed, and that *spasm* enters into every case of obstruction more or less, whether the case be stricture, prostate disease, or injury.

This over-distention of the bladder is a case for the use of the catheter; and when the bladder is relieved, you perceive that the urine will accumulate again to the same extent, unless it be regularly drawn off, and time afforded for the detrusor urinæ to recover its tone and action.

What will be the consequence of neglect in such a case? I have repeatedly seen the patient suffering little, and in ignorance of his condition, with the bladder distended to such a degree that it reached the umbilicus. But in younger subjects, and in general, it is a state of great danger, attended with pain and fever, with a urinous and ammoniacal smell, and hicough. When the bladder has been powerfully muscular, the case is worse, and the coats may give away, so that the urine escapes into the abdomen. See Stricture.

The bladder, however, does not burst. The term is inapplicable, as we shall see.]

I have mentioned inflammation, as in gonorrhœa, producing this distention; and I again call your attention to it, because you should not use the catheter here without positive necessity. Let your patient be bled, leeches, the bowels opened by laxatives, and let him have a good dose of opium and the warm bath; and by such means endeavour to relieve the spasm. But when you see one dancing round your room in agony, and the bladder has not emptied itself for twelve or twenty-four hours, and *you have reason to believe* there is no stricture, you cannot refuse the assistance of the catheter.

[But again, since we are considering the effect of disturbed action of the muscles, suppose the suffering patient has come into this state, and you learn that he has been under treatment for stricture, the catheter cannot be used without danger of disappointment, and indeed of aggravating the symptoms. It is in this case we relieve by

Drawing the urine off by the simple bougie.—Take the wax

bougie; soften it at the point by dipping it in warm water; give it the proper curve; oil it. Now the patient standing with his back to the wall or resting on his knees in the bed, you introduce the bougie down to the stricture. You hold it there, gently pressing it. The soft end moulds itself into the stricture perhaps: it is not necessary to the effect that it should. He is now to make an effort to pass urine. You persuade him to it; you dash the end of a towel dipped in cold water on his thighs. He thinks he could make water if the bougie were away. You withdraw it slowly; and after it the urine flows in a stream!

[Many is the time that I have done this, when the most desperate remedies were in contemplation.]

This failing, and the case urgent, we must have recourse to a slender catheter, an instrument to be avoided if possible.]

Operation of the catheter.—In selecting an instrument, bougie or catheter, to introduce into the bladder, take the largest that will pass freely, and without giving pain in passing through the orifice. For the orifice is naturally the narrowest part of the canal; and the large round extremity of the catheter will pass over the lacunæ and other impediments, when a smaller instrument will hitch into some of the natural impediments.

Lay the catheter in a basin of warm water; place the patient with his back to the wall, resting; dip the catheter in oil, and introduce it with the concavity towards the pubis.

[In time you will come to prefer introducing it with the convexity towards the pubis; but this implies a turn of the instrument as you pass the point under the arch of the pubis. Some will affect to make this *tour de maitre* with great skill, when, in truth, it has nothing to do with the real difficulty of the operation.]

If the patient is lying horizontally, you rest the hand on the haunch, and draw up the penis to the point of the instrument; and let me say, that in whatever way the catheter be introduced, the penis should be stretched, as if it were drawn on the instrument, instead of the instrument being pushed in!

[I have witnessed with pain the surgeon introduce the catheter with one hand; a vanity which should receive a school-boy's punishment.]

Be careful in passing the instrument through that part of the urethra, which is braced up to the bones of the pubis by a ligament. This is a narrow part of the urethra, and just before it, is the largest and the most dilatable part, the *sinus urethræ*. Just, therefore, as you depress the handle of the instrument that it may pass under the arch, you encounter this difficulty. See then that the point does not swerve from the centre, and that it be carried in a gentle curve. If you meet any difficulty, lay the three fingers of the left hand on the perineum, and draw the integuments forward; and thus let the points of the fingers be as a fulcrum, so that on depressing the right hand the point of the instrument is raised.

If the point of the catheter has passed the ligament of the urethra, it enters what has been called the membranous part; and then it may hitch against the fore-part of the prostate gland, a part somewhat restricted by a fascia. Here the instrument should be carried bodily forwards, not in the curve.

[If difficulty be here encountered, the finger must be introduced into the anus, by which the point may be directed, and the parts drawn towards you, by which the interruption to the point will be removed.

It is possible that the point may be caught within the prostate, and just as it should enter the bladder. Violence here may lift the inner membrane of the bladder.

In using a small pointed instrument, the end may enter the *sinus pocularis*, which gives great pain, and brings on swelled testicle.

A variety of catheters, silver of different curves and lengths, and elastic gum catheters preserved in proper curves, are to be desired in the surgeon's cabinet.]

Of Diseases in the Prostate Gland.

[The student of surgery has his most important lesson to get from the dead body. He should examine the outside and neck of the bladder,—the place of the entrance of the ureter,—the relation of the vesiculæ seminales and prostate gland,—the distance of the prostate from the anus. He may consider how these parts should feel with his finger in ano in the living body. He should open the bladder, and pass his probe along the mucous membrane, thinking of the possibility of natural obstruction to instruments, and the place of diseased obstruction.]

What is commonly meant by diseased prostate gland, does not occur in young men. But the prostate may become inflamed, and abscess may form in it and around it, in youth—than which there are few more distressing complaints.

It results from what is called suppressed gonorrhœa in a scrofulous constitution. When the urine gets access to these suppurations about the prostate gland and vesiculæ seminales, they may destroy the patient with fever and irritation, and an incessant call to urine.

[In addition to the common means taken to support the constitution, and to soothe the local irritation, I have seen great benefit from washing the passages by means of the catheter and syringe. You contrive that the stream shall gently play from the side hole of the catheter into the sinuses.

When the ducts of the prostate are enlarged, and when abscess opens into the passage, be very careful in using the catheter that the point does not get entangled. You might in that case, without much seeming violence, carry the instrument between the bladder and the rectum.

The prostate gland, as we advance to mature years and in old

age, becomes subject to disease. 'The patient is often sensible of a fulness of more than usual irritation, and of some hesitation in commencing to make water. But very often he comes to you with obstruction of urine, and with no conception of the cause. He is in pain from distention, and you feel an unnatural fulness above the pubis. You must relieve him. In twelve hours the bladder is again distended, and he requires the catheter twice a day for some time. Gradually the bladder recovers. You do not see your patient perhaps for three months; at least till you had forgotten the circumstance, when he appears again and precisely in the same condition.

But your patient, as I have hinted, comes to you in a different mood and with different symptoms. He thinks he has got incontinence of urine; it dribbles away continually. But his age and history make you put your hand upon his abdomen, and you find a circumscribed tumour above the pubis. He is very unwilling to believe that the bladder is distended, and much surprised he is when the catheter is introduced, and he finds the chamber-pot filling and not done yet!]

The prostate gland is subject to various diseases; a simple scirrhous enlargement, a varicose condition, and more malignant softer tumour.

The varicose state that attends some kinds of enlargement of this body, is followed with very distressing symptoms. These veins burst and discharge blood freely into the bladder, so that it coagulates there and obstructs the flow of urine.

When you find *bloody urine*, you anxiously inquire into the source of it. Is it from the kidney? Is it from stone in the bladder? Is it from priapism? Is it from the prostate or the cavity of the bladder?

I would have you treat hemorrhage from the prostate gland as an internal hemorrhage, or as you would a woman threatened with miscarriage. Avoid using the catheter if possible. When you use it you will find it stopped up with coagulum, and you will have to inject a very little tepid water before you will be able to relieve the bladder either of blood or urine.

As the urine flows into the bladder, the coagulum dissolves, and the urine is for a long time charged with blood. At length it is clear, and the patient remains well for an indefinite time, until a shock in riding, or a plethora of the gland, causes the veins to burst out again.

The prostate becoming enlarged, swells unequally. On examining per ano you may feel it large and soft, or indurated more on one side; or you may feel it moderately enlarged, and yet attended with obstruction of urine; that is, when it is enlarged in what has been termed the third lobe of the prostate. This is the *uvula vesicæ* of old authors, a projecting tumour from the posterior and deepest part of the prostate into the bladder, and which rises like a valve, falling before the stream of urine to obstruct its egress.

[The uvula vesicæ is attended with peculiar symptoms, which were well explained by Sir Everard Home. The patient conceives that he empties his bladder entirely, because on straining he forces out the urine. The reason is this. The bladder is over distended, but by the action of the abdominal muscles, the fundus being pressed, that part which lies on the bladder is distended, and by its distention it drags down the uvula, opening a passage for the urine as long as the strain continues. In this manner is the patient deceived, and he will not be undeceived until on introducing the catheter, he fills the chamber-pot with urine.]

The introduction of the catheter in the case of diseased prostate gland, ought to be an operation of delicacy. Petit and Desault are indifferent to the breaking of the membrane, nay, an idea prevails that it is good to unload the varicose vessels! There cannot be a greater mistake. Abrasion of the surface of the diseased prostate fills the bladder with blood, and lays the foundation of ulcer and fetid discharge, and increase of irritation.

[When you use the catheter in the case of diseased prostate, you may presume that the greater swelling of the gland is under the urethra, and therefore that that canal is raised.

In which case it is obvious that when the point of the catheter has arrived in the membranous part of the canal, you depress the hand to raise the point, that it may surmount the obstruction beneath.

It is for the same reason that the elastic gum catheter is used, which, requiring less guidance (and, indeed, from its elasticity admitting of less) by accommodating itself to the irregularity of the passage, glides past the obstruction.

You understand why a full-sized instrument is used, that a small point striking against a sudden turn of the urethra (such as must be the consequence of any inequality in the tumour of the prostate) is apt to injure the membrane and lodge.]

If you find obstruction here, do not continue to press the instrument (as Desault recommended, and others following him) under the false notion of subduing the swelling of varicose veins! But introduce the finger into the rectum, feel both the point of your catheter and the prostate, and directed by the finger, carry the instrument higher and in the proper line.

[When this is neglected, the point, as I have said, lodges, and there is much blood; and on every succeeding attempt the instrument falls into the part where there is already a lodgement made, and it becomes exceedingly difficult, sometimes impossible, to relieve the bladder by the catheter.]

When the prostate gland is generally and greatly enlarged, a longer catheter than that usually made use of is required, in order that it may pass through the gland into the bladder.

[I made a dissection (the preparation is in the College of Surgeons) where the catheter had been used, and, as the surgeon supposed, passed home. The point, however, did not pass into

the cavity of the bladder, and the patient died of distended bladder !]

When the diseased prostate gland takes the form of *uvula*, you should place the patient reclining backwards, that the tumour may fall back, or at least be more easily pushed off from the urethra.

The use of the catheter, in some conditions of the prostate, may be required for years, and with no farther inconvenience than the necessity of drawing off the urine twice a day. This, however, becomes a grievous tax upon both surgeon and patient, and the patient must be taught to relieve himself.

In other cases, it may become a question whether or not there may not be a better prospect of ultimate cure, by keeping the elastic catheter in the bladder, and strictly enjoining rest in a horizontal posture.

[As to the farther treatment of the disease of the prostate, 1. Guard against lodgement in the rectum by the use of clysters; 2. Apply leeches to the hemorrhoidal vessels; 3. Mild laxatives; 4. The tepid bath; 5. A pill with conium and pil. hydrarg., or soap and opium, or Dover's powder,—the bowels the while kept open by castor oil and manna, sulphur, and confection of senna.]

Before treating of stricture in the urethra, one or two hints on the treatment of gonorrhœa may be necessary, since the sequel of that inflammation is so frequently the cause of stricture.

[Insist on abstinence from butcher-meat and wine; keep your patient in a horizontal posture; open the bowels smartly with a purge, in which the tartarized antimony is an ingredient; drink plentifully of barley-water, with gum arabic, or make for him a pleasant electuary with gums. Soothe the irritation by Dover's powder. Apply as a lotion equal parts of the camphor mixture, aqua ammoniæ acetata and rose-water to the penis.

R. Confec. sennæ.

Pulv. cubeb.

Bals. copaiba.

Syrupi. q. s. ut ft. electuarium molle. Let him take the size of a nut three times a day.

Many surgeons declaim against injections, and they have reason, after permitting their patients to use them, as I see injections prescribed; that is, without precaution of any kind, by which they must reach the irritable part of the urethra and neck of the bladder!

The seat of the specific inflammation of gonorrhœa is within less than three inches from the extremity of the penis. Consider also that an injection is of no service, unless it distends the membrane of the urethra, and you will see the necessity of the following precaution.

"When you inject, compress the urethra with the ring finger of your left hand, anterior to the scrotum, against the bone, so that

not a drop of the injection shall pass beyond; and if you feel it pass, desist. Take a bit of thick soft leather, and cut it of the size of a shilling; bore a hole in the centre, and put the nozzle of the syringe through it, and so you may put on a second and a third. These are to prevent you passing the pipe of the syringe too far into the inflamed urethra, and to prevent the injection coming back."

By these precautions the injection is made to fill and distend the urethra, and so it ought to be kept for three minutes, and used thus three or four times a day. A proper injection thus used can do no harm, and a mild astringent injection thus used will do more to the cure of the disease than all the stimulating and acrid injections that you see in books. The following is a good injection:

R. Zinci sulphatis, gr. vi.

Solve in aqu. ferv. ℥iiss.

R. Liquoris plumbi subacetatis, gtt. xii.

Aquæ ferventis, ℥iiss.

Misce solutiones et fiat injectio.

The mischief arises from a young man concealing his condition, and thinking himself obliged to eat, and drink wine, and ride, &c.

The chordee is caused by erection when the membrane of the urethra is already inflamed, and has consequently lost its elasticity. Being powerfully stretched, it cracks, and you have hemorrhage. It is obvious that if you do not subdue this, you lay the foundation of strictures.

When there is priapism and chordee, you should insist on bleeding and leeches and fomentation, for the inflammation is running backwards to the sinus of the urethra. Wholesome discipline now may save the patient from a multitude of evils; or what is still worse, abscess by the side of the prostate gland and vesiculæ seminales.

When there is great pain, and frequent calls to make water, inflammation of the bladder is imminent, and requires the most active measures. General bleeding, leeches, laxatives, the warm bath, anodyne clysters, camphor and opium, and afterwards the uva ursi, with carbonate of soda, &c.

The consequences of gonorrhœa most to be dreaded are, inflammation of the bladder, inflammation of the vesiculæ seminales, and abscess at the neck of the bladder, partial inflammation of a chronic kind in spots of the urethra, gleet, and strictures,—a catalogue sufficient to put a young man on his guard, and to make him submissive.

The gleety discharge, if not corrected, is certainly the forerunner of stricture. If there be inflammation, it must be subdued; if little inflammation, the use of the simple bougie may be had recourse to.

The canal should be put gently on the stretch, after which the discharge will increase, and then happily subside altogether. The

gleet continuing in a relaxed and perhaps strumous constitution, tonics may be taken.

R. Aqua puræ	3x.
Spirit. cinnamomi,	
Syrupi,	āā ʒi.
Tinct. ferri muriat.	gtt. xx.

Ft. Haustus, 6 horis sumendus.

The Irritable Bladder.

Children have often an irritable bladder, which makes them pass water when in sleep,—a great distress to the poor things themselves and those about them.

A similar condition of bladder in young men is attended with great shame and restraint. I have known young men of twenty-one who dared not sleep from home, and who, on visiting, have been obliged to sit up all night, lest they should disgrace themselves.

[A nurse tied a cord about a child's penis, to prevent it wetting the bed, and the cord cut into the urethra!]

I have known young men treated with bougies for months on account of this irritability, and put under a mercurial course, the invariable resource of ignorance.]

There may be a formidable case of irritable bladder, and you must discover the cause,—probably disease of the rectum or disordered action in the bowels. It may be morbid secretion from the kidney and sympathy with that gland. These are to be thought of, and the cause ascertained.

But there is another circumstance not unworthy of consideration. The position of the child in bed should be attended to. When we lie on the back the urine gravitates to that sensible part of the bladder on which the action of the muscles depends. The sensible spot on the interior of the bladder, just below and posterior to the opening into the urethra, commands the muscles at the neck of the bladder as infallibly as the sensibility of the glottis controls the muscles of respiration. When that spot is irritated, you are forced to make water!

[If you order that the nurse shall lay the child on its cheek, inclining it to lie on the stomach or the side, there will be no call to urine,—no wetting of the bed. On giving this rule to older patients, they have found it infallible; so much so, that they would start up the moment they were sensible that they had turned on their back, knowing the consequence.]

When the bladder has contracted a habit of action, the patient should be recommended to measure the quantity of urine which he makes, and accustom the bladder to retain more by little and little. It is in this case that the injection of the bladder is of advantage. The bladder receiving as much tepid water as the patient is in the habit of evacuating at one time, will retain it until a double quantity

of water is accumulated. And in this way the bladder may be dilated so as to resume its natural condition of action.

This washing of the bladder is also of use when there is irritability from the accumulations of mucus from the prostate.

OF STRICTURE IN THE URETHRA.

When I asserted, and to the unbiassed in judgment proved, that the membrane of the urethra was not muscular, Home and his immediate pupils sneered at the doctrine. Nor is it to be wondered at that they should, as it overturned much of their opinions and practice. The membrane of the urethra is a mucous membrane, and there is no instance of such a membrane being muscular. The fibres are always exterior, and in the urethra there are enough of exterior muscles to account for the symptoms attributed to the contraction of the stricture.

It is very easy to persuade a patient, when he has a stricture, that the occasional obstruction to the discharge of the urine arises from spasm in it; and especially when, after any little irregularity, he is unable to pass his urine, and feels a girding and pain in the seat of the stricture; and when he finds that the surgeon cannot introduce a bougie, he attributes these indirect effects to a spasmodic state of the stricture. If he is relieved by the warm bath, opium, and other antispasmodic medicines, he is then convinced that he has a stricture, which is occasionally spasmodic.

But the patient is deceived, and, what is of more consequence, the surgeon is also in an error; for it can be shown, that this spasm is not in the stricture itself, but that it is a spasmodic action of the muscles surrounding the urethra.

A stricture in the urethra is an effect of inflammation, which destroys the fine elasticity of the membrane. We have the whole extent of the urethra sometimes thus affected. But the common stricture results from a chronic inflammation which affects a small part, a sequel of more general action.

[If you take one of my urethra probes (which is a little silver ball on the end of a wire) and pass it into the canal, you will find, especially after gonorrhœa, that there are sensible spots over which the ball passes with pain, and intervals of the membrane between these spots which have no morbid sensibility. These inflamed portions of the urethra are the commencement of strictures.]

The *dilatable stricture* is when the point of the bougie meets with obstruction, and where, at the point of obstruction, there is exquisite sensibility. By continuing the pressure, the instrument at length passes. In this way a large bougie is made to pass, and the patient is led to believe that he has no stricture,—neither has he,—but if this inflamed spot be permitted to remain, he will come back to you, after some months, with a confirmed stricture, *i. e.* with an obstruction that does not yield to any reasonable pressure with the bougie.

[Desault is of opinion, that stricture is a consequence of ulcer in the urethra. This opinion prevailed, but it is not correct; although, undoubtedly, an abrasion with instruments and consequent ulceration, will produce stricture, which is a reason against that boldness and false show of dexterity which I have had so often to condemn.]

Stricture sometimes forms in the orifice, it may anywhere in the canal, but most frequently it forms near the bulb. And there is a reason for this; it is the most irritable part of the urethra, where the inflammation consequent on gonorrhœa lingers longest.

A simple stricture, that is, one which has formed without interference of the surgeon, is a dense filament, not always directly across the canal, but when it is so situated, corresponding exactly with the description of Mr. Hunter; and its effect on a wax bougie is precisely as if a thread had been drawn in a knot upon it.

[A stricture, however, is very seldom found thus simple; for the stricture opposing resistance to the flow of urine, an inflammation is kept up, which produces a farther thickening; and very often the use of instruments has farther increased the disturbance, causing an irregular thickening. This disturbance may amount to irregularities in the whole course of the urethra.

Behind the stricture inflammation is kept up by the push of urine. Often this produces a deposit of coagulable lymph there; and as we shall have occasion to notice, sometimes the membrane ulcerates immediately behind the stricture.]

Until we consult the dissected body, we shall form no correct idea of the consequences of strictures.

Behind the stricture the urethra is enlarged. If there has been much suffering, coagulable lymph is thrown out, and the lacunæ are enlarged, and the sides of the canal become irregular.

The consequence of this is, that the surgeon having overcome the stricture, finds the point of his bougie or catheter entangled, and he has great difficulty in passing the instrument into the bladder. But these irregularities are removed in time, if the stricture be cured.

The part of the urethra embraced by the prostate gland is dilated, and the ducts of the gland very much widened; there the point of the catheter is apt to lodge.

In a confirmed narrow stricture the bladder is much contracted, and its coats thickened, and the muscular coat is particularly strong. In the worst cases, coagulable lymph hangs from the interior surface of the bladder, and if the patient has been cut off by an accession of inflammation, the fundus exteriorly is loaded with dark blood.

[This contraction of the bladder is the consequence of frequent and long continued action. But we find when the attack has been sudden that the bladder is greatly distended. The ureters are frequently much distended, and the pelvis of the kidney, showing that they also suffer in stricture; and it is when they are affected

thus, and the secretion of the kidney impeded, that great irritation and fever and effusion on the brain takes place.

Symptoms of Stricture.

The symptoms are these: 1. Frequent call to make water. He rises in the night time to relieve the bladder. 2. The urine does not flow readily,—it passes off involuntarily when he thinks he has made water. 3. It passes in a feeble divided stream. 4. There is some discharge. He is subject to chills like the attacks of an ague.

Treatment.—The contracted orifice of the urethra must be treated by gentle dilatation with the short silver or metallic bougie. Violence produces reaction; slitting the orifice is not advisable; the caustic is useless.

[The stricture of the orifice is very often attended with great distress, and sometimes with abscess in the perineum.]

Sir Everard Home put the whole profession wrong in the matter of the treatment of stricture, by the publication of innumerable cases treated by means of the lunar caustic. The caustic is to be reserved for very particular cases.

Let it be your care not to make a breach in the membrane of the urethra. The natural membrane is elastic. When you destroy this natural mucous membrane, you substitute a portion of dense cellular membrane and new coagulated lymph. As long as the bougie is used, this substitute for the natural membrane serves its purpose, but it ever has a disposition to become more and more dense and inelastic, and so the stricture forms again! The patient, consequently, is never independent of his surgeon; that is, he must be in the occasional use of bougies. This is a great evil.

[So it happens that when Sir E. Home convinced his patients that there could be no permanent cure without *burning* the stricture, and when he succeeded in making a slough, he insured the return of the stricture.]

The permanent cure of stricture is to be accomplished by dilatation; not sudden dilatation, but such a stretching of the narrow part of the canal that it *grows* large under the operation, and has no disposition to contract, the natural membrane resuming its texture and office.

Use of the wax bougie.—Much is to be accomplished by the simple wax bougie. In introducing a bougie, give it the proper form, let it cool to have some degree of stiffness; and in introducing, see that you humour the form of the bougie to the turn of the urethra.

[We see the bougie very properly turned up at the point, so as to pass easily; but in introducing it, the softened wax is made straight, and the point hitches on the narrow part of the canal behind the sinus.

When you have difficulty in passing the stricture, use all gently.

Take a bougie, oil it, dip the point into warm water, so as to make it quite soft. Introduce it down to the stricture, press it gently for half a minute. On withdrawing it, you have a cast of the stricture, and if you have taken care to preserve the relation of the bougie to the urethra, you see the size of the stricture, and to what side the passage inclines.

Now, taking a small bougie—one adapted to the diameter of the stricture as impressed on the mould—you give the point an inclination, so that in introducing it, it shall avoid the filament which obstructs, and fall into the right direction.]

The bougie being introduced into the stricture for ten minutes every second morning, the stricture relaxes. You very gradually increase the size of the bougie. The more gradual the dilatation, the more permanent the effect. Having passed a bougie of the full size, you prepare for leaving it off. You pass it twice a week; once a week; once a month; and after some time, the patient returns to see that the cure is complete.

By the use of the *elastic gum catheter*, a narrow stricture may be dilated in the course of three days. You introduce the catheter to-day, and on the morrow the urine passes by the side of the instrument; you pass a larger instrument. It is at first held, but in twelve or twenty-four hours, it is loose in the passage, and you may introduce the largest size.

[But the stricture is not cured! in eight days the canal is again restricted. Here is the proof that you must do a little at a time, if you expect the advantage gained to be permanent; and you must leave off the use of instruments very gradually.]

The caustic (nitrate of silver) was used by Mr. Hunter only in the case of stricture so complete that no instrument could be passed into it. I have had patients so old as to have submitted to the method in practice before the time of Hunter. They destroyed the stricture by "ulceration." This they contrived by the use of the bougie. Their bougie had some elasticity. They introduced it into the urethra, making the point bear upon the stricture. They then tied the bougie to the glans penis. The patient bore this until the point of the instrument excited ulceration in the stricture, when the point went through. But this was a most dangerous mode of proceeding, and you perceive what often happened, the formation of a false passage. Such, however, was the operation for which John Hunter substituted the caustic. It was Sir Everard Home who, making the profession believe that he was pursuing the "principles" of Mr. Hunter, introduced the universal practice.

The "armed bougie" is a wax bougie, opened at the end to let in a piece of the lunar caustic, which by this means is introduced down to the stricture.

In using the caustic bougie, we proceed in this manner: We take a bougie of the common kind, adapted to the urethra, but the extremity of which will not pass the stricture. We take a caustic bougie of the same size and form; we then give both of them the

proper bend to answer to the place of the stricture; we then oil them, and lay them by us, for, if kept in the hand, they lose their firmness. Then taking the glans penis in the fingers, the simple bougie is introduced with a uniform motion, until it meets the stricture. Having ascertained that the point bears against the stricture, a mark is made with the nail on the bougie, that the depth of its insertion may be ascertained. It is now to be withdrawn. The simple and the armed bougie are now placed together, and a mark with a nail made on the armed bougie corresponding to the place of that on the simple bougie. The armed or caustic bougie is now introduced with a uniform motion of the wrist and fingers, until it is opposed by the stricture: it is gently pressed, and a steady gentle pressure is to be continued for the space of a minute.

In the application of the caustic bougie to an old and confirmed stricture, there is often no pain experienced; and the pain and heat in such a case are the effect of the liquefaction of the caustic. Where there is a small bridle stricture, the bougie, as commonly prepared, must permit the caustic to touch some part of the natural surface, and there will be a burning sensation accompanying the application.

When the bougie is withdrawn, a soft white matter covers the surface of the caustic. This is not a slough, but is the effect of the caustic coagulating the natural secretion of the passage. This concremented matter sometimes remains in the passage until driven out by the urine. The patient is ever willing to believe this the slough of the stricture.

The proper slough generally comes away in small shreds with the urine. After a very severe application, at the distance of perhaps three days, the patient feels an unusual obstruction in the passage, and straining, he brings away the slough.

When I wrote the volume on Stricture, I had given up that severity in the application of the caustic, which produces distinct slough and temporary obstruction to the urine; and I am now well convinced, that in the case adapted for the use of the caustic, a slight application, that is, a short continuance of the application compared with what was then practised.]

Mr. Whately introduced the use of the *kali purum*. He broke it into very small pieces, and picking a portion of the size of a pin head, he made a hole for it in the wax bougie, inserted it there, and by this means passed it down to the stricture.

[It did not destroy the firm stricture, but it removed the irritability; it had also the advantage of making a soap with the secretion of the canal, and thereby facilitating the introduction of the bougie. It was a safer, and a milder practice than that of Home.]

Forcing the Stricture

Is a most dangerous practice. A catheter with a conical point is used. It is forced through the obstruction, and remains in the bladder. It seduces you, because you do at once by a dexterous hand what others may be slowly attaining through patience and many operations. Be aware of the danger—which is, that you force the point into the spongy body of the urethra, or the substance of the prostate gland.

Suppose a patient is under treatment for stricture, and that on a sudden there is total suppression. The bladder is distended with intolerable pain. The means of bringing on a flow of urine is used—bleeding, laxatives, the warm bath, opiates. They fail. There appears a necessity of puncturing the bladder. Instead of which, the surgeon determines to pass the catheter, and he may succeed if the stricture be simple. He certainly will not, if the stricture has been made firm by many attacks of inflammation. He forces on the catheter—he feels it tear up the texture—blood flows copiously, but no urine! The patient's case is infinitely worse.

If it is to be accomplished, it is thus: let the patient be supported in the erect posture—sit down before him—pass the catheter down to the stricture—keep it there gently pressing—be sure that you are in the line of the urethra—withdraw the instrument to feel if it has entered the stricture—at last it resists the little tug to withdraw it—it must then be in the stricture, for when the point is out of the natural canal, it is never held. Be sure that the point has entered, you carry it steadily onward, and happily the urine flows!

Keep the catheter in, and put him to bed with an opiate.

Piercing the Stricture.

In my early practice I cut the stricture, and have to be thankful that I saw my error without fatal consequences, and gave the practice up. The practice has been renewed in London. I had two or three illustrative cases admitted into the hospital. You will find the practice in the French authors Chopart and Desault, under the term *sondes à dard*, and reasons sufficient against the practice.

RUPTURE OF THE BLADDER.

When the bladder is distended, it does not rend like a dead bladder; it is not burst.

When the bladder has risen suddenly above the pubis, and perhaps to the navel, there is great danger, not that it shall burst, but that it shall ulcerate, for I believe that is the more correct term.

I have had several cases of actual bursting of the bladder, and

the preparations are in the museum of the College of Surgeons. But they occurred in consequence of falls when the bladder was full. When the distended bladder gives way without external violence, we find on dissection one or two small black ragged holes—the bladder flaccid—and the urine in the cavity of the abdomen!

The symptoms of such a calamity are, the fever increasing to delirium, and the disappearance of the hard tumour of the bladder without evacuation of urine by the penis.

But this is not the manner in which a patient with stricture generally dies. He is worn out with fatigue and sleeplessness. The bladder, as I have said, becomes thickened in its coats, diminished in its capacity. He is on his knees, straining every half hour, until worn out with exertion, pain and fever. His countenance is haggard and wild; he becomes incoherent; his respiration is hurried, and so he dies.

You perceive, then, that in this most common case of all, he dies of obstruction of urine, and yet the bladder is empty! perhaps not containing an ounce of urine.

How the Bladder is to be relieved in case of total Obstruction.

[I have punctured the bladder in three different modes, and of late years I have rejected them all for the following method of relieving the bladder. It is a manner of operating to be pursued whether the bladder be distended, or whether the patient be suffering from contracted bladder and incessant pains to make water.

The operation is done on these assumptions—a stricture in the urethra never takes place further back than the posterior part of the bulb. Behind the stricture, the urethra is always remarkably enlarged.]

Place the patient on the table, as for the operation of lithotomy, only that there is no occasion for tying him; the operation is neither a painful nor a protracted one. Put a catheter or a sound down to the stricture, and give it to an assistant; introduce your finger into the rectum and feel the prostate. Thus prepared, take a sharp-pointed bistoury, slightly curved—plunge it into the perineum, just anterior to the anus—carry it towards the face of the prostate. The finger is in the gut—the knife is carried in the outside of the gut. When the point has arrived at the prostate, the hand is to be depressed, and the point thrust into the urethra. It is to be brought out, cutting along the membranous part of the urethra, and at the same time in a manner to open the integuments of the perineum largely. The urine spouts from the incision, and the patient feels instant relief.

The patient from this moment being safe, and freed without that torturing dissection which we have seen so long practised of cutting into the stricture, you may put him to bed, or finish the operation. I prefer seeing him recruited before I proceed farther.

You may destroy the stricture at your leisure (because there is

now no danger to the bladder,) and having passed the catheter through the stricture, you direct it into the bladder, a matter of no difficulty. The parts are healed over the catheter. There is no greater triumph of art than a cure thus conducted.

Puncture of the Bladder from the Rectum.

The position of the patient is on his back, the perineum presented, and the assistants holding the thighs apart. The oiled finger is passed into the rectum, the distended bladder felt. The long trochar suited for this operation (the point of the stilette being withdrawn within the canula,) is passed along the finger and within the gut; directed by the finger, you press it against the distended bladder—then pushing forward the stilette, you pierce the bladder. You are careful, in carrying on the instrument, to remember the axis of the pelvis, and to direct the point towards the centre of the brim by depressing the hand.

[See that in feeling your way with the finger in ano, you sufficiently distinguish the parts. When you pass the finger into the rectum, and turn it up beyond the inner margin of the sphincter, you ought to feel the prostate. You must push your finger beyond that, to feel the more elastic fulness of the bladder. You are now made sensible that, if the prostate gland be enlarged, you cannot reach the bladder, and that this is no operation for obstruction of urine from diseased prostate.

I have seen the surgeon fail in this operation; and, on dissection, I found that he had run the trochar into the body of the enlarged prostate, having mistaken it for the bladder!

I have also found on dissection the vesiculæ seminales pierced with the trochar!

I have succeeded better by directing the instrument into the bladder by the side of the prostate rather than behind it. But it is essentially a bad operation.]

When the bladder is relieved, introduce an elastic gum catheter through the silver canula, and withdraw the latter. When we consider the substance between the bladder and rectum, it is surprising that, on the catheter being pushed out (which it will be during the action of the bowels, unless much attention be paid,) the urine passes by the rectum until the stricture be relieved.

The Operation above the Pubis.

The bladder may be punctured above the pubis, but the bladder must be distended, and have risen high to make this operation practicable. By the rising of the bladder, the peritoneum is pushed up, and the reflection of that membrane is so far raised, that a space is left between the os pubis and the reflection, where the trochar may pierce without transfixing the peritoneum. The patient is placed reclining backwards with pillows under his loins; an incision is made just above the pubis, first through the integuments and then

through the linea alba, sufficient to let the finger feel the distended bladder. Into the bladder he thrusts the long trochar, with its concave side towards the pubis; he directs the point a little downwards, towards the centre of the brim of the pelvis. On withdrawing the stilette of the instrument, the urine flows at first with force—by-and-by with a diminished stream.

[The reason of making an incision before puncturing the bladder, is to prevent the infiltration of the urine into the cellular membrane behind the pubis, and between that and the peritoneum, to give free outlet to the urine if it should escape from the bladder.

And in general it does escape and do mischief; for whether the canula be left, or an elastic catheter introduced through the canula—whether the operator stop when the tension of the bladder is moderately relieved—or whether he draw off the whole urine,—the misery is that urine does escape, and produces slough of the cellular membrane behind the os pubis, and consequent irritation and fever.]

In all cases, unless it be where the prostate gland is enlarged, and where total obstruction has been brought on by the catheter lodging in the gland, the operation which I have described of cutting into the urethra is to be preferred.

Besides, let it be remembered, that the patient may be dying of obstruction of urine, and yet the bladder at no time contain an ounce of urine! In them, and they are by far the most frequent cases, you cannot puncture the bladder. But by opening the urethra behind the stricture, the bladder begins gradually to relax, and to admit more and more urine to accumulate. The happy consequence of this is, that the patient not only makes urine early, but has longer intervals of rest to recruit his exhausted powers.

It is always valuable to obtain an insight into the reasons of action of sensible men, such as Mr. Hunter and Mr. Cline.

Mr. Hunter finding his patient retching and hiccoughing, and the distended bladder risen to the navel, and the abdomen tender—and his efforts being ineffectual to pass an instrument by the urethra, he punctured the bladder above the pubis.

Here, then, are the circumstances in which Mr. Hunter preferred an operation which would give immediate relief, and which would, at least in the first instance, be attended with no disturbance to the constitution,—an operation which he himself had projected and executed.—See Mr. Hunter's own edition of the *Treatise on the Venereal Disease*.

In that operation, as I have seen it performed by our best surgeons, and the pupils of Mr. Hunter, it is tedious, and there is much dissection and fingering for the instrument; the incision is large and deep, and the constitutional powers cannot stand this protracted interference.—See *Society for the Improvement of Surgical Knowledge*, vol. ii. 353.

I have heard men say, "I never puncture the bladder." Very good—but what then? what is your substitute? I acknowledge

that if an intelligent surgeon has the whole management of a case, he may have to boast that he never punctures the bladder. But the surgeon of an hospital, or a consulting surgeon, is not in this situation. A poor creature, after long suffering, has total obstruction, and withal, is in that nervous irritable condition in which he will hardly let you approach him; what is to be done must be done quickly; no protracted operation will be permitted. I have told you how I have proceeded in using the bistoury in the perineum, and I believe it to be the best mode of proceeding, but I can still foresee the case in which the puncture of the bladder is the instant and only resource.

In the volume to which I have last referred, there are three cases which I would have you to read for a different purpose. They are by Sir Everard Home. They are instances of that very improper use of the caustic bougie, which in his hands was doing great mischief—and, by imitation all over England, incalculable harm.

He is at length obliged to puncture the bladder, which he does by the rectum: the quantity of urine evacuated is four ounces.

I would have you, as anatomists, to say—what are the hazards of the operation when the bladder is dilated only to this extent? It is the case in which the operation I have described ought to be performed.

RUPTURE OF THE URETHRA AND FISTULA IN PERINEO.

When the strictured patient has a burning in the perineum, with a sensation of fulness, and strains to make a few drops of urine, he is in danger of extravasation of urine. The ulcer in the urethra behind the stricture is about to give way.

[This state is very frequent after the improper use of the bougie.]

The patient, straining hard, feels the bladder is emptying itself; but no urine flows! It passes into the scrotum; and to the dismay of the patient, the scrotum first, and then the penis, is enormously distended.

[If he be not immediately relieved by incision, a black spot appears on the scrotum, and the urine may extend the integuments of the pubis and groin.]

If he still be neglected, the scrotum sloughs,—the countenance changes—the pulse becomes feeble—the stomach sympathises, he is sick, has hiccough, and sinks.

The anatomist understands what has taken place; the urethra, weakened by ulceration, has burst under the impulse of urine. The urine has got into the cellular membrane; but instead of making a swelling exactly at the place of rupture, the perineal fascia has directed it forwards into the loose texture of the scrotum.]

In a good constitution, and in youth, nature, after sad ravages, will sometimes relieve herself; the whole scrotum sloughs off, leaving the testicles, hanging bare; and, more strange to say, I

have seen granulations form, and a new scrotum involve and cover these parts!

Treatment.—A timid, or rather an imperfectly educated surgeon, is satisfied, on seeing the scrotum thus distended, with putting his lancet into the swelling, and letting the urine drain off. You must use your bistoury, and open the scrotum below, and carry it backwards, so as not only to let the extravasated urine out, but to give freedom to that which must follow from the breach in the urethra.

You may, in addition, puncture the fore-part of the scrotum, and the penis, if necessary.

[Do not mistake the swollen prepuce and œdematous penis, the consequence of inflammation and a too bold use of instruments in the urethra, for a case of rupture.]

For the rest, the parts must be fomented; the irritation subdued by opiates; the strength supported; and the stricture removed.

Urinary Abscess.

In the preceding division of our subject, we considered the effect of the membrane of the urethra being inflamed to ulceration, by which the urine burst out. In the case of abscess, the urine does not first burst out. Still the matter of the abscess is a consequence of inflammation within the canal. Sometimes the inflammation of gonorrhœa will produce it; or the inflammation of Cowper's gland; and most commonly it is caused by improper interference with the bougie.

[The bougie, properly used, diminishes irritation, and subdues spasm; but used recklessly, and too often, it produces swelled testicle, and abscess. The abscess is frequently the consequence of bougies being put into the patients' hands, who, though at first they are timid enough, become at length too bold, and the inflammation in the canal is increased.]

The patient complains of heat, throbbing, and swelling in the perineum: and on examination a swelling and hardness is felt, which increases and extends towards the anus.

When the parts are in this state, the means of reducing the inflammation are in vain pursued. It may at once suppurate and open. But generally the muscles at the neck of the bladder are deranged in action. The pressure of the matter, too, on the urethra causes difficulty of passing urine, or total obstruction.]

The abscess must be opened, and the earlier the better. The pus forms here very quickly. Use the abscess lancet freely. The matter spouts out to a distance, and the bladder is relieved. At first there is no urine, but afterwards urinous smell in the dressing shows you that if the urethra was not open in the beginning, now it is.

The *practice* at this stage will be to soothe the urethra, and to proceed very slowly with the dilatation of the stricture, if that has been the cause.

[*E. g.*—Fomentations and poultice to the part, after you are

confident that the evacuation of urine and matter is free; laxatives; mucilaginous drinks, and opiates; laudanum, æther, and liquor potassæ, in camphor mixture; the pill saponis cum opio, &c.]

This abscess degenerates into *fistula in perineo*, if the cause be not removed; that cause being stricture, with inflammation in the urethra. The exterior orifice of the abscess contracts; the urine lodges, and causes other abscesses; they open and discharge. Again, there is succession of chills and fever, and new abscesses, until the perineum, scrotum, and neighbourhood of the anus, become irregularly hard and swollen, with fistula remaining in different directions.

In the mean time the stricture is no longer simple. Coagulable lymph is deposited around it; the canal of the urethra is compressed and distorted by the external swellings; and the patient's condition is altogether most distressing, with fever and increasing irritability.

The operation is a difficult one. If you can remove the stricture, all does well; the openings close, and the hardness is subdued, and the parts resume their original softness and texture. But too often this object is not to be so easily attained. The stricture is callous and irregular, and the canal so twisted that an instrument cannot be passed; and the caustic aggravates symptoms and makes no progress.

The operation.—You will have by you, catheters, probes, bougie, a syringe, with the instruments of the pocket-case. The patient is placed in the position as for lithotomy. A catheter or sound is introduced into the urethra, down to the stricture. As to probing the fistulæ, they are irregular, and the probe in this stage is useless.

The incision must be a decided cut in the direction of the raphe, designed to lay bare the urethra. But considering the state of the parts, that they are dense with repeated inflammations, you can hardly expect to make a dissection to lay aside the parts, and to disclose the bulb. The whole mass is of one consistence, and dense.

Directed to the place of stricture by the point of the catheter, you divide it, and you pass the point of your bistoury from it in a direction backwards, to lay open the canal behind the stricture.

Having found the passage, you may pass on the catheter into the bladder, and the operation is finished.

[It is very often difficult to find the urethra behind the stricture; and of all things remember that a protracted dissection here is most dangerous. For the patient being in a miserable state, exhausted by long suffering and extravasation of urine, and a succession of abscesses, to be kept long on the table in addition to all,—this is death!

Therefore if, after a fair attempt to find the urethra, you are disappointed, pass the finger into the rectum—feel for the prostate—look well to the centre of the body—and pass your sharp-pointed

bistoury in, anterior to the prostate, and cut towards you in the line of the urethra.

This must relieve the bladder; and putting the patient to bed, with a large opiate, you wait your time.

When I have succeeded in finding the urethra behind the stricture, I have, when the patient was reduced by previous long suffering, been satisfied with passing a short elastic gum catheter into the bladder; and deferred passing the catheter until the fever and distress were diminished.

When the catheter is passed, the parts heal by granulation over it; and the final success will depend on the way in which the urethra has been treated. If you have passed the catheter through the stricture into the urethra behind it, the cure will be permanent. But if you have brought the catheter out anterior to the stricture, and in again into the incision of the urethra behind, the patient may be satisfied, and the cure apparently quite satisfactory; but he is destined to require the use of bougies for the rest of his life, and is in perpetual danger of relapse.]

OF THE PREPUCE, PHIMOSIS, AND PARAPHIMOSIS.

The prepuce is in some rare instances imperforate at birth. Sometimes the orifice which should correspond with the urethra is exceedingly small. I relieved a little boy who made urine in great pain. He was held in his father's arms, crying piteously, while he made water. The prepuce was distended like a bladder, and from it a hardly perceptible stream of urine jetted from a small hole. I cut it up with the point of the bistoury, and the little man pissed and laughed!

[You must read Petit on this subject; *Traité des Maladies Chirurgicales*. You will be rewarded by some curious stories. But practically there is more in this matter than will be found in books.]

The prepuce is narrow in different degrees, so as to produce a train of very various symptoms, some of them unexpected.

In the greater degree the glans is not uncovered. If the urine passes from the urethra in such a way as to circulate under the foreskin, no bad consequences may follow till the child is grown up. But then it happens that the secretion of the glans of the corona is confined, and gives rise to inflammation and discharge.

An injection of milk and water, or a weak solution of zinc, will relieve this, and prepare the part for the operation.

The tightness of the prepuce may be in that degree, that, being drawn back, it may not easily return: in that case it forms *paraphimosis*, and strangulates the glans; being attended not only with great pain, but with retention of urine. This condition, too, has its obvious remedy.

But the tightness being in a lesser degree, the effects are often more agonising. A concealed band or ligament is in the reflected

margin of the foreskin. It permits the glans to be uncovered. But during erection it constricts the penis behind the glans, throws back the seminal discharge, and produces agony.

There is another condition most severe on a Benedict. The narrow prepuce gets inflamed by this distention. It becomes chopped, and little wounds like ulcers form around it. In priapism they are torn open with great suffering, and continence or an operation are the alternatives.

Gonorrhœa in a narrow prepuce causes great disorder. The presence and irritation of the matter produces warts of the glans and interior of the prepuce, and at the same time much discharge. There is altogether a great mass; and this mass, when disclosed by cutting up the foreskin, assumes an alarming appearance; the extremity of the penis being like a cauliflower.

Sometimes the suppuration within, and the narrowness of the prepuce, cause ulceration on the side, through which the glans at length protrudes. Thus the appearance is very peculiar, so that repeatedly it has been taken for cancer; and I have known amputation of the penis performed under this impression, when all that was necessary was to slit up the distorted prepuce, and to destroy these innocent warts, the product of mere irritation.

The operation.—(Do not attempt to remedy the natural phimosis by dilatation; and do not, if it be possible to avoid it, make incision of the prepuce when in an inflamed state, and especially when the patient is affected with mercurial.)

In the natural or congenital phimosis, do not cut up the whole prepuce, but putting in your probe, and elevating the edge, you feel that the tightness is in the very margin; put a little bit of wax off a bougie upon the point of the sharp-pointed bistoury. Introduce the point thus guarded under the prepuce; push the point (regardless of the wax) through the inner fold of the skin, and bring it out through the margin. You continue to cut more of the inner fold than of the outer skin. You draw the foreskin over the glans, to see that the stricture is effectually relieved.

I see by the observations of some authors that they have either seen this done awkwardly, or have done it so: for they say, "that it leaves two flaps!" It certainly will, if you cut up the whole prepuce; but this is never necessary in the congenital phimosis.

The operation may be done with two incisions; that is to say, instead of one longer incision, the bistoury may be used on the right and left margin; when, if the patient studies appearances, he may be assured that there will appear nothing of the operation in one condition or another of the penis.

If it be necessary to open the prepuce largely, then an appearance rather alarming is presented to the patient; for when, after the incision, the foreskin is drawn back, it appears as if the whole penis were flayed and left bloody. This is owing to the separation of the two layers of which the foreskin is composed; and in this case it

may be necessary to stick them together at the angle by a single thread.

[This incision will probably divide the vein, and afterwards, especially if he becomes alarmed, the patient may lose much blood. Put him therefore on his guard, or use the needle so as to prevent it.]

There is *another operation*, which is circumcision. You take between the finger and thumb of the left hand, the firm ring of ligament which is the evil to be removed, and you make the patient at the same time draw the integument against you. Passing the sharp double-edged knife through close to your grasp, the whole margin is cut off by one movement of the hand.

[The Jew draws the extremity of the foreskin through a slit in a silver plate, and cuts it off.]

When there is a hardness of the anterior part of the prepuce, the circular incision will be best. But observe, that if you are not careful to draw back the natural and elastic integument before cutting, you will disclose a large bloody surface.

Adhesion of the Prepuce to the Glans.

I must presume that it is want of cleanliness that causes an inflammation of the back part and interior of the prepuce to the corona glandis. The adhesion gradually advances on the glans. It requires a nice dissection to separate it from the corona, and much care on the part of the patient to prevent it from reuniting. I have dissected clean, and touched it with the brush and caustic lotion.

Paraphimosis.—When a boy has drawn back his prepuce and cannot return it, pain and distention, and the strangulation of the parts, are the consequence. If the inflammation be not very great, you compress the glans with your thumb, while with the fore and middle finger you draw forward the integuments. But this is a most painful operation, and something more must be done.

The integuments will be found much swollen anterior to the stricture, and the stricture deep, so that it is difficult to get the probe or directory under it. In this, however, you will probably succeed; and when this is done, it is easy to introduce the sharp-pointed bistoury, and to cut outwards.

If this cannot be done, you must penetrate the skin behind the stricture, and pass the probe or fine directory forwards under the stricture, and then divide.

We are told that the firm covering of the corpus cavernosum penis has been penetrated. This must have been from inexcusable awkwardness.

To be sure, if you cut until you can reduce the glans, you may go very deep. Be satisfied with recovering the stricture. The parts will in the end resume their natural appearance and looseness.

DIVISION III.

OF THE GREAT OPERATIONS.

CHAPTER XXI.

OF AMPUTATION.

We must proceed on the supposition, that it is determined to lose the limb to save the life. For to pretend, in a preliminary discourse, to decide upon the cases for amputation, would be to take in review all the important questions which have been discussed, under compound fracture, wounded arteries, caries, white swelling, gunshot wounds, and tumours! It would be about as wise as prefacing a book of surgery with a description of the anatomy.

We are informed that amputation was anciently performed by cutting at once to the bone, and sawing the bone through. It might have been done, but certainly not a second time by any sagacious operator. Because he must have seen, on the very first occasion, that by the wasting of the skin, and the projection of the bone, the cure was delayed, and the stump a bad one.

The truth is, then, that they always retracted the skin, and forced up the muscles, so as to cut through the bone as high as possible. There are some things so obvious that men cannot miss them—and this is one of them.

An amputation is well performed when these objects are attained:—1. The skin so cut that it shall cover the muscles. 2. The muscles covering and concealing the end of the bone. 3. The bone sunk deep, with all its periosteum about it. But besides these, there are other very important circumstances which innovators forget—the ligature of the arteries, and the condition of the nerves.

This latter point I consider as by much the most essential; for the pain of nerves engaged in the cicatrix of the stump, is beyond all the most severe, and not only prevents the use of an artificial leg, but disorders the whole system, and entails a variety of nervous complaints.

Of the Circular Amputation above the Knee.

[*Apparatus.*—You look around, as you ought in all the principal operations, to see that every thing is prepared. Will you believe that the late Mr. Lynn, of the Westminster Hospital, on putting out his hand for the saw found there was none! and they had to send to the joiner. That, on another occasion, in tapping a woman, the foolish assistant gave him the stilette, and kept twisting the

canula between his fingers, which was not discovered until the surgeon had plunged the instrument into the woman's side! Recollect what befel a good man, that on operating for the stone, and having made his incision, there were no forceps—no, nor within twenty miles of the place. From that time the gentleman resigned his profession, and all men pitied him.]

Therefore, I say, trust no man when you are about to operate. On this occasion, have these,—compress and bandage, tourniquet, amputating knife, saw, bone forceps, tenaculums, small forceps, split cloth, strapping, compress for the face of the stump, and Malta cross or some substitute for it, dressing, rollers, sponges, basins, cold and hot water, wine and water, bed prepared; appoint your assistants or friends to their duties, and let a young gentleman sit low and steady the leg. The roller is around the loins of the patient, and pinned up.

The Tourniquet.—You place the compress with its attached roller on the femoral artery, and in passing round a bandage to fix it, see that you do not make this too tight.

[If you do, the operator is disconcerted in taking up the vessels on the face of the stump. For when the arteries are tied, and the tourniquet loose, still blood is poured out. It is the bandage which you had put on, and which now compresses the veins.]

Where the compress is, as in this case, on the fore-part of the thigh, the tourniquet may be put directly on it. See that the strap is strong, that the buckle does not interfere, and that the power is not exhausted, if the operator require you to screw tighter. See that, before the operation is begun, the whole is slack, and the circulation free. For by having the tourniquet tight, to such a degree as to stop the return of the blood by the veins, you fill the limb with blood, and the patient loses more than is necessary. You will know when this is done, by the blood jetting from the veins on the first touch of the knife.

Most surgeons make a simple circular incision through the integuments. I always inclined the amputating knife, so as to make two semicircles, one on the inside, the other on the outside of the thigh, but without raising the knife; it is done in a moment.

Now, let the assistant draw back these integuments, whilst you repeatedly touch with the knife the cellular connections with the fascia. You make no dissection; without that your assistant finds no difficulty in holding or in folding them back.

[I care little about the fascia, but if the integument be not well drawn back before the fascia is divided, the nerves which take their course in close connection with it are left too long.]

You set on the knife close to the retracted margin of the skin, and carry round the knife at once to the bone.

The pupil who has sat holding the leg now rises, and raises the limb so that the thigh-bone is perpendicular. You touch with your knife as the muscles withdraw themselves from the bone, especially on the back part, and at the *linea aspera*.

[If you at this juncture take a general view of the parts cut, you ought to see, towards the leg, the skin retracted off the fascia, and the muscles projecting, and about two inches of the bone bare. This being the exactly opposite state of the section towards the body, exhibits a proper condition of the divided parts.]

The assistant throws over the split cloth, puts a slip on each side of the bone, twists it below, and retracts the muscles so as to keep them off the motion of the saw.

The surgeon should not cut off the periosteum from the bone. In sawing the bone, the saw is to move horizontally.

[This is to prevent what infallibly happens, when it is held steadily by the assistant as he sits on his stool. As the saw passes through, he holds the limb up, and that interrupts the saw; he draws it down, and that splinters the bone.]

When the amputation is thus performed, and when you bring down the stump, the bone has disappeared entirely among the muscles; you see it no more unless you again raise the stump to the perpendicular. When you bring the integuments over the muscles, they fall together neatly, their edges exactly corresponding, and without the slightest pucker or irregularity. This is the perfection of the operation of amputation, done by two or three motions of the hand! and with incomparable advantages in the after treatment.

The arteries.—Without undoing the tourniquet, the arteries are secured. You find the femoral artery on the inside of the bone: see that you draw it fairly out of its sheath, and distinguish it from the vein which is nearer the bone. Then you seek the great descending arches of the profunda: the one on the outside, the other towards the inside of the face of the muscles, recollecting to seek for the larger branches in the interstices of the muscles, not in their substance. I advise you to use a ligature of three threads for the main artery, of two threads for the lesser arteries. Do not cut their ends off, but twist them firmly and neatly together, and lay them on the side of the wound. Mark the ligature of the main artery with a knot.

Undo the tourniquet and compress, and place a warm sponge on the face of the stump, and wait.

[In commenting on this mode of operating, I observe that authors tell you to cut down to the muscles. This I must presume to be an inadvertence, unless they mean that you are to cut the fascia twice. This leads me to notice a passage in Mr. Guthrie's excellent work on Gunshot Wounds, which I do not comprehend. He says: "But in the adoption of it (simple retraction without dissection of the skin,) they do not seem to be aware that the fascia and integuments should be divided by the same incision, when the whole will retract much further than the skin and cellular membrane could do, if the fascia remained to be divided by the second incision."

The operator generally partially cuts through the fascia, but not by intention. The fascia does not retract but in the least degree, and its connection at the sides of the thigh would be required to be

ent deep before we could attempt to cause retraction of it. Therefore there is here some misapprehension, probably on my part.

Writers express themselves with horror of turning back the skin! as if it were necessary to dissect between the skin and fascia to do this. This may be required in the circular incision, when inflammation has preceded and thickened the integument; not only in the case of wounds, when you wait for the period of suppuration, but also in cases where inflammation, and perhaps abscess, has come upon a diseased joint. But it does not require a fibre more to be divided to turn back the skin; only a slit upon the edge of the integument.

However, if you take my recommendation to form the two semi-circular cuts, instead of the direct circular incision, you will experience no difficulty.]

Of Amputation with two flaps, and a comparison of the modes of operating.

The operation of amputation with a flap¹ must always prove an important consideration. In the case of wounds, the surgeon must often carve out the integument on one side so as to cover the face of the stump. Sometimes a clever operator will provide a bit of skin here, and another there, anticipating the mode in which they will fall together, in order to the fulfilment of the great rule—that muscle shall cover bone, and integument muscle.

In desperate wounds, as those in which the limb is torn by machinery, when the poor patient has been still suffering from the violence—pale, exhausted, and trembling like a wounded bird—I have taken the torn flap of skin and muscle as part of the amputation already executed: and I have, by laying my knife into the wound, and under the flap, completed the amputation by forming a flap to correspond with that made by the injury. Nor have I found reason to repent this mode of operating; although the rule be, *that you go above the part injured, and make a clean amputation.*

I have operated in this way principally to avoid the severe shock of amputation, in a condition of the nervous system already severely shaken by the accident.

Mons. Vermale's Method, according to Le Dran.

Gentlemen must not speak of the prejudices in favour of the circular amputation, or we shall be obliged to say they have never seen it performed as it should be. When an operation is very easy, it is sure to fall into incompetent hands. The question as to the right method is a very serious one, and should be so examined.

¹ The operation of Le Dran with two flaps, must, I imagine, have been a good operation eventually.

There are two inventions which have been most improperly praised. The first is the *oblique* division of the muscles by Mr. Alanson, which is nothing less than a mode of cutting away muscle, which is of the utmost value to the formation of a good stump, and which is against the valuable aphorism of Petitt—*to cut as little of the muscle off, and as much of the bone as possible*. The other improvement is, to divide the muscle at two cuts, the proposal of M. Louis; to cut first through the loose muscles, and then those which are firm. I have seen enough of this; it is a manner of digging out the muscle from the centre of the stump, and offering a most irregular and ragged surface from which to pick out the mouths of the arteries.

In amputating the thigh with two flaps, a long sword-like knife is employed. The surgeon with his left hand grasps the mass of integument on the inside of the thigh-bone. He makes a stab perpendicularly close to the bone, and carries the knife a little downwards, that is, towards the knee; he inclines the edge towards the surface; and finishes by cutting through muscle and integument obliquely to the surface. Grasping the mass of muscle on the other side, it yields; so that, entering the knife as before, and at the same point, he is enabled to perforate the mass on this side; and the knife being made to cut its way out obliquely downwards, the operation is in a manner finished, and with a dash and eclat very seducing. The soft parts are retracted, and the bones sawn through in the common way.

This is the operation practised by Desault. It has appeared to me to be attended with less pain than the circular amputation.

Let us consider the different conditions of the face of the stump. The muscles being cut obliquely, and in some measure drawn out by the knife, the integument (which has a thin edge) is too short to cover them. You will see this exemplified in the flap operation below the knee, where the parts being cut from within, the gastrocnemius hangs out beyond the skin.

The muscles being cut irregularly and obliquely, the arteries are not easily found, and their mouths are of the shape of a pen; whereas, in the other mode of operating, their mouths present directly, and are easily found in the flat muscular substance.

But all objections are of no consideration compared with the state of the nerves. They give less resistance, are drawn out before the edge of the knife, and hang from the face of the stump. I have seen it necessary to cut off a full inch and a half of the popliteal nerve from the face of the stump.

I have been brought to reflect on this subject, because I have never seen so many cases of affection of nerves in the stump as in the last years of my attendance on the Middlesex Hospital, which I attributed to the mode of operating with the flap. I had long made it a particular injunction on my pupils, that when they amputated in the common way, they should, on retracting the integuments, be careful to cut short the cutaneous nerves which run upon

the exterior of the fascia, and not to leave them with the integuments; and this I did under the conviction from experience, that those sensible cutaneous nerves being engaged in the cicatrix, gave rise to great distress. You will perceive that, in the flap operation, the cutaneous nerves are left long, projecting to the very edge of the integuments.

[You will find a very meritorious paper on the stump after amputation, in vol. xvi. Med. Chir. Trans., by Mr. Langstaff.

He states that the nerves of the stumps have invariably an enlarged extremity, like a ganglion. But these bulbous extremities are not the result of the enlargement of the proper texture of the nerve, but a deposition of lymph in the cellular membrane covering the neurilema.

It is important to observe what he says on the adhesion of these nerves. "They are generally adhering to the surface of the stump, and frequently in union with the spicula of bone."

Mr. Langstaff informs us, that, in a patient who suffered pains in the stump, extending to the hip, for thirty years, he found the extremities of the sciatic nerves united together, and to a portion of the projecting bone.

In whatever way you amputate, these dissections, as well as the sufferings we witness in patients, evince the necessity of burying the nerves deep in the stump. I have often referred to this subject at clinical lecture; for unless the surgeon attend to this matter (and they do seem to think very little about it,) the patient who has suffered amputation becomes an invalid,—a sort of barometer, exhibiting the change of weather. The skin is tender—pulls upon the extremity of the bone—presses the exquisitely sensible nerve against it. Hence pain and twitches, and nervous starting of the limb; and thus the foundation is laid of permanent bad health. After these observations, you will perceive how I consider the question to hinge as to the mode of operating. A clever operator will make a good stump either way.]

Of Dressing the Stump.

"The dressing," said an excellent surgeon, "is of far more consequence than the mode of operating."

We left the surgeon holding a soft warm sponge to the face of the stump.

Operate in public as you would in private; let no ignorant impatience hurry you into slovenly ways. You grasp the stump, hold it down, and draw forward the integuments. The assistant unpins the roller, which is fixed to the patient's loins, and begins above and rolls down to your fingers, and then pins it. You now bring the edges of the integuments neatly together, and your assistant having heated a strap, lays it across; first laying it down on one side, and then adjusting it to the edge, he lays it down on the other side. You keep supporting the integuments with a dry cloth,

until the other straps are laid down. Now put slips of dressing over the face of the stump; then a compress of tow; and over this the cross straps.

These cross straps being laid along the stump, they are retained by a few turns of the rollers; and they are drawn tight or relaxed as occasion requires.

In the evening, if the patient complains of the stump being tight, you loosen these straps without disturbing the dressing.

The intention of this careful rolling of the stump is to compress the veins and cellular membrane, so that the adhesive inflammation in the mouth of the vein may prevent the inflammatory action on the face of the stump from being communicated to the great vessels. The great vein being properly compressed, adheres; and otherwise it lies loose and open, and the inflammation of the general surface will be communicated to it.

On the fifth day you look to the stump. There is no smell—no purulency; it is full, plump, and adhering; therefore readjust the bandage, and do not disturb the stump.

Two days after you dress the stump. Prepare for this by ordering a fomentation cloth or cataplasm to be laid over the stump to soften the dressings. When you take away the adhesive straps, take one at a time, and replace it (for the adhesion must be very weak) by another, so that the integuments may not burst up or fall loose. These straps of adhesive plaster should be snipt in the centre, opposite the line of union, or there should be a space left between them. The matter, if any, must not be confined.

Certain ligatures on trifling vessels you now twist away, carefully preserving that which is on the main artery. You dress as before, taking care that, as there must be partial suppuration, you leave a drain by which matter may escape. The ninth is a critical day with a stump; it is apt to burst up, after promising a complete union by the first intention. Still proceed as before, and keep the parts supported.

The ligatures so much talked of, being removed from the smaller vessels, the longer ligature being brought out below, so far from being a source of irritation, conveys the matter from the face of the stump; and if you do not so manage as to make this use of the ligature, place a piece of dressing at the lower edge of the line where the skin meets, so as to keep that part open and give vent to discharge.

I have in other parts of this work (p. 65) described the bad effects of deep suppuration with confined integuments. The case of the stump after amputation is not so far removed from a compound fracture, but that the parallel may hold. The integuments may unite, and the muscle be in a state of bad suppuration (an effect for the most part of careless dressing). The discharge must be made perfectly free, disregarding altogether the new adhesions.

It is this very occurrence which, not provided against, has caused such surgeons as the most estimable Baron Larrey to dress the

face of their stumps, keeping the integuments open until they are in a state of suppuration, rejecting the English manner of proceeding altogether.

As to treatment after amputation, I hope I have anticipated all that is most essential. You see for the most part amputation performed for diseases which have exhausted the patient. Remember the different condition of those who have suffered the operation from accidents, or in the field. They require a stricter antiphlogistic treatment, and probably bleeding.

The fears we have are from the constitution suddenly giving way about the fifth day, in cases of amputation after violent injury to the limb; and then from fever producing a bad suppuration, and from inflammation of the veins.

Hemorrhage from the Stump.

Hemorrhage from ruptured adhesion you will readily distinguish. Hemorrhage from veins you will manage by the roller. But if hemorrhage proceeds from the femoral artery on the face of the stump, do not expect to tie it if the surface be foul and sloughy, but make an assistant compress it, and lose no time in cutting down upon the fore-part of the thigh and securing the artery there. It may have been accident, but I have always seen the sloughy face of the stump rapidly improve after this has been done.

Amputation of the Stump.

[You will find a paper on amputation in the second volume of the Memoirs of the Royal Academy of Surgery of Paris. You there find them discussing the mode in which to avoid the conical or sugar-loaf stump, and the projection of the bone. Considering how English surgeons have vaunted their manner of operating, yet it has presented so often of late years that I had to invent an instrument by which the integuments are to be pushed back and the bone sawn again! The academicians you will find discussing the question, whether the projecting bone should be left to exfoliate or be sawn off.

M. Maunoir of Geneva published a memoir in favour of the English mode of operating in amputation. In that essay he contrasts the method of which he is the advocate, with that practised by Dupuytren, who having divided the integuments and muscles together,¹ took the farther means of insuring a bad result by raising

¹ After the battle of Waterloo, certain Frenchmen were brought to me who had suffered amputation. The stumps were so novel a sight to me that I made a drawing of one. There came off a round cake of sharpie, which corresponded with the face of the stump. The stump itself was one uniform flat surface, integument, muscle, and bone forming one plane, as you may see in a ham shop.

up the stump to the perpendicular; and this he did for a reason somewhat too ingenious,—that the blood might be impeded by the sudden angle of the artery at the groin, and the ligature protected.]

I have explained the mode of turning up the stump and disclosing the bone, before sawing the bone. If this be done, and the stump afterwards gently held down by a piece of bandage over it, and pinned to the mattress, you will never see the bone again: it is deep among the muscles, removed from the nerves, *so that they shall not be folded on its edge*, and also in the condition the least likely to give you trouble by exfoliation. But if the old rule be taken, "that the assistant entrusted with the lower part of the limb should, as soon as the flesh is divided, hold the bone firmly down upon the end of the board or table," then most certainly, on the stump rising, the bone must project, and then there will be abundant scope for the grand question, "Whether is the denuded bone which projects from the integuments of the stump to be permitted to exfoliate, or is it to be sawn off?" as was debated in the French Academy.

As to the conical stump, the manner to produce it is exactly that recommended by Alanson,—that after dividing the integuments, you should fix the point of the knife on the bone, and moving it round in an oblique direction, scoop out the muscle. Or the manner of M. Louis, which is to do the same thing by an easier and clumsier method. The effect is, however, sometimes produced by the suppuration and wasting of the flesh, and contraction of the skin over the bone, when the surgeon cannot be blamed.

[There has in all this been an entire mistake. On the face of a stump the mass of muscle degenerates, but there is left an insensible tough mass covering the bone, and between it and the integuments, or between it and the cicatrix. By this scooping away, as well as by the formation of a flap, this mass of flesh is taken from between the bone and integument.

The deficiency of the muscular mass tends to the formation of a conical stump.

My friend, Mr. Guthrie, in order to avoid exfoliation, recommends scooping out the muscles to the end, that the bone may appear deep in "the bottom of a cone as a depressed point." Let him take the advice of an old friend, just to try the mode I have advised, and he will see the "depressed point of bone" disappear altogether.]

A stump should be round, full, and fleshy. The best compliment I ever received was on the disclosing one of my amputations, and the idle dresser painting two eyes and a nose on the face of the stump, it appeared like a chubby cheeked boy, with a pursed mouth restraining a laugh.

But the stump does not remain always round, the flesh wastes very considerably; and here let me remind you that you have a severe critic on your operation; the cork-leg maker is provoked when you leave too much skin, which becomes loose and flabby.

But if the skin and bone come into contact and adhere, without the intervention of a mass of muscle (no matter that the mass has

degenerated), the bone projects and ulcerates from time to time, and becomes a source of great distress.

It is a thousand times worse when the nerves are engaged in the cicatrix and drawn over the face of the bone, and the only relief is

Secondary Amputation.¹

You make the skin be drawn back, and with a sweep of the amputating knife, go round and round, with instant relief to the nervous pains. Putting on the retracting cloth, you expose the bone as far as possible, and saw it through.

There is one circumstance more to be noted. The flexor muscles retract more than the anterior mass, so as to give an inequality to the old face of a stump. In order to bring the cicatrix behind the point of bone, it has been proposed to make a flap on the fore-part of the thigh to fall over the bone. If this be your mode of proceeding, take care that there is something more than the integument in the flap.

[I was wont to manage this by a slight inclination of the knife, so as to leave the ham-string muscles a little longer.]

High Amputation and at the Hip-Joint.

[Read Mr. Orton's paper, Med. Chir. Trans. vol. xiii. He successfully amputated at the hip-joint. There does not appear to have been disease in the joint, and the question recurs, was it necessary to take the head of the femur from the acetabulum?]

In amputation high in the thigh I have proceeded in this manner. The assistant was instructed first to compress the artery at the groin. Afterwards, as soon as I had made my incisions, to grasp the flaps largely with his hands. My first incision began by an oblique cut with the scalpel, which laid bare the femoral artery and profunda; I cut them across, and drew them out with the tenaculum (in the mean time the blood was flowing backwards from the mouth of the femoral artery below.) I then set on the great amputating knife in the cut already made, and continued it in an oblique direction to the bone (taking care to keep the integuments of length to project a little from the muscle). The instant this was done, the mass was grasped by the assistant. I then made, with the same knife, another and a larger flap on the outside. I then took up the bleeding vessels from among the muscles of the flaps; and, lastly, sawed across the bone. The soft parts came well together.

It is possible to amputate high up with the assistance of the tourniquet; if you use it only while you secure the principal

¹ "Secondary amputation" is used to denote an operation performed at the second period or time of suppuration.

vessels, and throw it off before raising the limb and sawing the bone.

An opinion is universally expressed by such old authors as Heister, Le Dran, &c. &c., that high amputation of the thigh is dangerous; the constitution suffering a shock in proportion to the mass taken away, and in proportion to the extent of divided surface. That this danger must be increased by taking off the thigh at the hip-joint, there can be little doubt.

Mr. Guthrie says he considers "the prejudice (against amputating at the hip-joint) common to both British and French military surgeons." But why call this a "prejudice?" It is an opinion formed on great experience, and almost universal. We must then weigh the prejudice against the vanity of having to say, "I have done it,"—a vanity that never prevailed so extensively, and to such a degree, as of late years. I never saw this desire of distinction so evinced as on one occasion, on going round my museum with an Italian surgeon of distinction. We were looking on a diseased thigh-bone, when, "mounting his eyes," and putting his hands together, he said, "I let the most glorious opportunity escape me of distinguishing myself." This zeal may be all very natural, but it is not of the highest order in the walk of ambition. The safe surgeon is one whose reputation is above this, and based on better grounds.

The main question is one which we cannot discuss here—In what case is it necessary to disarticulate the head of the bone, and amputate the thigh? I have some hesitation in giving my assent to the propriety of the operation in the cases in which it has been done.

Baron Larrey cuts down upon the crural artery and vein, and includes them together in a ligature close to the crural arch. He then plunges his long knife, cutting on both edges, between the muscles attached to the lesser trochanter and the neck of the bone, and makes a flap on the inside. This exposes the articulation. It is easy, he says, to cut into the joint—easy to divide the round ligament; when the assistant, extending the limb outwardly, he passes his knife between the brim of the acetabulum and the great trochanter, and cutting downwards and outwards, forms his second flap.

Mr. Guthrie, the best entitled to have an opinion on this subject, makes some objections to this mode. He, after the inguinal artery is secured by compression, makes two semicircular incisions, commencing four fingers' breadth below the anterior superior spinous process of the ilium, the inner incision forming the larger flap. The integuments being retracted, the *gluteus maximus* and *gluteus minimus* are cut from their insertions, to compose the flesh of the outer flap; then the muscles of the inside of the thigh are divided, the artery and veins are at the same time cut across. These vessels are seized by the fingers and thumb, and the *tenaculum* thrust through them, and the ligature put round them. The surgeon

then cuts through the small muscles which run to the trochanters, and opens into the capsule, and disarticulates the bone. Mr. Guthrie recommends expedition. To say the truth, it is a rude operation, however it may be performed; and certainly, without much to applaud, if that be the object, it may be done in a few seconds. Since giving this advice, Mr. Guthrie has taken off the limb at the hip-joint, and with complete success. He was ever noted for the precision with which he made the parts fall together in the stump.

Mr. Guthrie thus proves the practicability of the operation consistently with the preservation of life. An author has added to his commendation, that he hopes to see it performed as readily as the amputation at the shoulder-joint. God forbid. The difference is immeasurable.

Amputation below the Knee.

Place the tourniquet a little above the middle of the thigh; the compress, where you feel the artery, passing under the sartorius. When you put the tourniquet upon the popliteal artery, you require to screw it with great force.

Assistants as before;—the retractor a cloth of three tags;—a scalpel by you.

Take your position on the inside of the limb. Mark the insertion of the ligament of the patella into the tibia. Measure off a full hand's breadth downwards, and then begin your first incision.

Stretch your hand round under the limb. Setting on the amputating knife on the spine of the tibia, incline it a little downwards before you make the full sweep of the circle. When you bring the knife round till within two inches of meeting the incision, incline it upward, to fall in on the point where you commenced. Touch the cellular connection all round as the assistant retracts the skin. You do not require to dissect under the integument, in order to fold up the integument; but, instead of this, the assistant may put round the edge of a towel, to draw back and to guard the posterior part of the integument.

Setting on the knife close to the retracted skin, you cut round to the bones. But with one sweep you cannot divide the whole; the muscles are guarded by the projecting spines of the bones. With the point of the knife you cut between the bone, first on the fore part, then on the back part, and at the same time you pierce and divide the interosseous ligament.

[Your assistant in the short pause having, with the handle of the tenaculum, put through the centre rag of the retracting cloth from below, and having lapped the three stripes together, and gathered the whole in his hands so as to draw up the muscles, you perceive that he does you very little good. This is on account of the interosseous ligament. You therefore take the scalpel, and cut the ligament close to the bone; and as you cut, the retractor pulls up

the soft part from the bones. In thus relieving the interosseous ligament, take care that you do not divide the arteries, high up, and perhaps a second time. I have seen an unskilful operator cut the artery close to the division, attended, of course, with a full jet of blood, after the three arteries had been regularly tied. When the amputation is performed, so that the bones are divided near their union, it gives you much trouble to pick out the posterior tibial artery. But you must draw it out and tie it correctly, and if the blood continues to flow, see that it is not from some branch cut short just above your ligature.]

But to proceed. Having retracted the soft parts, you place the saw resting on the tibia, and so inclined that you cut through both bones.

Do not take off the head of the fibula; but this you may do—saw off the projecting angle formed by the spine of the tibia, since it projects sharp under the integument, and is apt to cause ulceration of the skin.

The three arteries being found and tied, you loosen the *tourniquet*, and find also the *surales*, muscular arteries in the substance of the gastrocnemius and soleus.

The integuments are brought together from the sides.

[When the flap operation is performed high on the leg, by using the long knife to penetrate behind the bones, and to form the flap, by cutting downwards and backwards, the integuments are cut too short, and the gastrocnemius too long. It hangs out with its fascia beyond the skin. When the flap is brought up, the skin is all too short, and requiring the ligature or firm strapping; it is irritated, and the stump goes wrong.]

Amputation with the Flap nearer to the Ankle.

No patient will thank you for leaving the leg long, unless his circumstances and duties enable him to have such an apparatus in the form of a wooden or leather foot, that he retains the use of the knee-joint.

If you amputate low in the leg, you should do it with a flap. The way I prefer doing it is this. With the large amputating knife, I form an oblique semicircular sweep through the skin. Drawing the skin upwards with my own hand, I set down the edge close to the skin, and cut obliquely upwards and to the bones. Having the knife so, look to the flap, and judge if it will correspond with what remains of the diameter of the leg to be divided. If it does not, move the edge of the knife upwards and close to the bones: having thus formed the flap without withdrawing the knife, sweep it round the fore part of the leg, dividing the integuments by a direct semicircular incision. Divide the remaining muscles which have been guarded by the bones, and pierce the interosseous membrane.

If rapidity of motion be desirable, this mode of operating should

satisfy you; since if cleverly done, it is finished without taking the knife from the wound, and nerves and blood-vessels are smoothly divided.

Saw the bones, take up the three arteries, roll down the calf of the leg, and bring the flap up with the adhesion straps.

[I confess most surgeons prefer doing this operation by using the catlin, stabbing with it through close to the bones, and making the flap by cutting downwards and towards the surface; infallibly the tendon will dangle out!]

Amputation of the fore-part of the Foot.

I shall borrow the description from my colleague Mr. Syme, who performs this operation very adroitly.

"The blade of the knife employed should be about six inches long, and half an inch broad, sharp at the point, and blunt at the back. The tourniquet ought to be applied immediately above the ankle, having its compress placed over the posterior tibial artery. The surgeon should measure with his eye the middle distance between the *malleolus externus* and the head of the metatarsal bone of the little toe, which is the situation of the articulation between the *os cuboides* and *os calcis*. Placing his fore-finger here, he ought to fix his thumb on the other side of the foot directly opposite, which will show him where the *os naviculare* and *astragalus* are connected. An incision somewhat curved with its convexity forwards is then to be made from one of these points to the other, when instead of proceeding to disarticulate, the operator should transfix the sole of the foot from side to side at the extremities of the first incision, and carry the knife forwards, so as to detach a sufficient flap, which must extend the whole length of the metatarsus to the balls of the toes. The disarticulation may finally be completed with great ease, as the shape of the articular surfaces concerned is very simple, and nearly transverse.

"The external plantar, anterior tibial, and any other arteries that require to be secured must then be tied, and the flap having been secured in its place by a few stitches, some slight dressing ought to be applied. During the cure the knee ought to be kept bent to relax the *gastrocnemius*."

Amputation of the Shoulder Joint—Excision of the Head of the Humerus.

Mr. Knight, inspector-general, desirous that the medical gentlemen sent out to join the army in the Peninsula, should be fit for all their duties, gave each into the charge of Mr. Lynn of the Westminster Hospital, to perform with him a course of operations on the dead body. The body was soon cut to pieces, and the course finished with the operation of amputation at the shoulder joint, a favourite operation of my friend Lynn, and which he had successfully performed. I cannot help conjecturing that this course of

study produced a familiarity with this resource of amputation at the shoulder, whilst there was a remarkable negligence in the consideration of the cases to which the remedy was applicable.

It may be an argument against this hypothesis, that the first time I saw the operation performed was by a naval surgeon, the late Mr. Vance, a good anatomist, and a man of singular energy. But when I reflected on the case for which this operation was performed, I made my mind up to oppose such a plea for an operation difficult in the performance and very severe on the sufferer. The humerus of that patient is in the College of Surgeons of Edinburgh. A musket ball struck the head of the bone, and shattered it so, that when I put my hand upon the shoulder, it felt like a bag of sand.

When I dissected this bone, I found only the head of it shattered, and I considered the subject in this manner. These surgeons do nothing when a musket ball passes across the deltoid. It is the state of the bone, then, that determines them to amputate. Suppose, instead of amputating, they cut through the deltoid, and took away the scattered bone, would it not be better—would not the man's life be more secure, the pain less,—and might not he retain something of a useful limb?

The next case I saw proved to me, that although the operation was easily done by a man accustomed to operations, it was not without danger in other hands; and that if it were to be considered an operation fit to be performed by every surgeon capable of performing the common amputation, that much loss of life must result.

I considered it then, and continue to look upon it, as very proper to diminish as much as possible the list of cases in which amputation at the shoulder-joint is to be performed. On returning from Portsmouth in January 1809, to my duties, I explained, at lecture, my views of this subject; and on the breaking out of the American war, the cast of the shoulder, now in the College of Surgeons of Edinburgh, was brought me, with a liberal acknowledgment of the surgeon that he had acted on my suggestion. You will there see that the head of the humerus being shattered by a ball, instead of taking off the arm, he had taken away the head of the bone. Anchylosis of the humerus and scapula was the consequence, and from the free motions of the scapula, a useful arm was retained.

(Now consult Baron Larrey, and the array of cases in Mr. Guthrie's work.)

After Waterloo, the operation was performed in the York Military Hospital, Westminster, but not in a manner deserving imitation. They made too much of an operation of it, by making a flap of the deltoid. I conceive the simpler and better operation is to divide the deltoid, in all its length, from the acromion, to the insertion of the muscle—to turn out the broken end of the humerus, and *smooth* it by the saw or bone nippers, and to pick away the broken portions of the head.

The amputation at the shoulder-joint is necessary in other instances, and the operation must be varied according to the occasion.

In general, it will happen that the deltoid is so destroyed, that the flap cannot be made by turning it up, else undoubtedly it ought to be done. But in other cases, you must make either two flaps on the side, or one larger lateral flap, according to the state of the integuments.

In preparing for the operation, you place the patient on a strong chair; put a sheet round him, and under the shattered arm; give this to a person to hold, and make him stand well off and out of the way; his business is to hold the patient up against the pressure which is to be made on the subclavian artery.

The assistant stands over him, pressing upon the artery in the hollow above the clavicle; the younger assistant sits low, holding down the arm. For if the patient raises the shoulder on the touch of the knife (which he is sure to do), the assistant's thumb is taken off the artery.

When operating, I have grasped the mass of the shoulder, integument, and deltoid, and with a sweep of the great knife raised the whole in a flap; an assistant raises and grasps the mass to save blood. The arm being held down to the side, with the same knife, or with a scalpel, I cut through the tendons of the infra and supra spinatus into the capsule, and relieve the humerus from the scapula so far, that you may slip the thumb into the joint; then with the fingers in the axilla, and on the outside of the integuments and the thumb within, you hold the whole mass of artery, vein, and nerves; you divide them by one motion of the knife, placed close to the bone, and cutting towards the side; which done, you continue your hold until the tenaculum being handed to you, you pick out the open mouth of the artery without losing a drop of blood!

Now, the whole surface being exposed, you are careful to take up the scapular or circumflex arteries, or muscular branches. Then look to the mass of nerves, and take care that they are cut short and buried deep. The flap is brought down, or the flaps brought together; and the surface, not to say the stump, has a better appearance than in any other amputation. Adhesive straps and the spica bandage are to be used.

Mr. Guthrie, considering only what is easy for him, an experienced, cool, and dexterous surgeon, to do, considers my precautionary mode of securing the artery as quite unnecessary. The artery is to be divided, trusting to the compression above the clavicle. Now, I consider it my duty to say, that, with the generality of surgeons, the patient through this over-confidence will be lost. I have seen the artery give out its blood in full jet, and it is a most alarming whish with which it is delivered. You are told, on this occurrence, to clap your doubled fist on the face of the stump. But to put a ligature on the artery, you must raise your fist, and hook up the artery whilst the blood is gushing. In short, the army surgeon must take the advice of a surgeon without an epaulette for once, or incur great responsibility; and remember that a man who suffers

from bleeding does seldom die under operation,—there is a shock from great hemorrhage from which there is no recovery; he sinks enfeebled.

Amputation of the Arm.

The amputation of the arm below the deltoid is very simple. Do the patient justice; do it *regularly*, and see that the nerves are well covered. Assalini showed me how he did it in the field. He had a long instrument like a pork butcher's, which was a knife on one edge and a saw on the other. Now, says he, I take the arm so, grasping it, and pressing the point of the mid-finger on the brachial artery. I make a circular incision of the integument; I retract the skin—make a second circular cut through the muscles—turn my knife—saw through the bone—lay down the instrument—seize the artery with my fingers and thumb—the assistant ties it.¹ I leave it, mount my ambulance, &c.

This being the very extreme of activity and dispatch, I hope our British surgeons will, in future wars, resign the contest, and rest their reputation, which they can very well afford, on something better than on rapidity of motion and the long knife.

When the amputation of the arm is made above the insertion of the deltoides, there are circumstances remarked by Baron Larrey; the deltoid being the antagonist of the pectoralis and latissimus dorsi, the end of the bone is drawn in upon the nerves in the axilla. The remedy is a very obvious one; divide the bone above the insertion of these muscles, which at least saves the necessity of opening the joint, and performing what in these circumstances the Baron recommends—the amputation at the shoulder-joint. We cannot comprehend his further reasons for preferring the amputation at the shoulder, viz. the difficulty of taking up the artery, and the irritation to the bundle of nerves from the ligature. We do not perceive the reason why the artery should be more difficult to tie, or why the ligature should be a greater source of irritation when the head of the bone remains in its place, than when the amputation is performed at the joint. However, there is so much in experience, that I would recommend attention to the remarks of the Baron. Mr. Guthrie is in favour of dividing the humerus below the tubercles.

Amputation at the Wrist.

A country surgeon, in his rides, meeting with a case in which the hand and fingers are crushed, may amputate, having only his

¹ I believe I have stated, that amputations performed after accidents, are attended with less activity of arteries than when the operation is performed for some exhausting complaint, as white swelling. This makes the practice here stated practicable, though not proper; the main artery secured, the patient will not bleed to death after the removal of the limb.

pocket case, as the surgeon-general of Ireland does it, by making a flap, and then cutting into the capsule, and turning out the ball of the carpus from the navicular cavity of the head of the radius. But surgeons have, in general, acted on the old advice, "that the parts about a joint digest ill;" and prefer amputating where they can cover the bone with muscle.

Amputation in the Fore-arm.

The fore-arm should be amputated in such a manner as to save a good portion of the flexor and extensor muscles. Mr. Syme recommends the wrist to be bent when the flexor muscles are divided; to be extended when the extensors are divided—of course, intending two flaps.

Amputation of the Toes and Fingers.

Mark well the centre of motion, or at least the centre of the joint; make a transverse cut, half a diameter anterior to the centre of the joint; divide the lateral ligament on one side, and turn off the bone; divide the remaining lateral ligament. Now place the scalpel flat under the bone, and moving the knife towards the extremity of the finger, cut out a flap of the firm and fatty integument on the palmer surface of the finger, of such extent as will, being folded up, cover the face of the cartilage.

In amputating at the metacarpal bone, do not cut into the palm, but on the dorsum only; by using the bone-nippers, you divide the bone and dissect it out, taking care to keep close to the bone.

Do the same in taking off a toe at the metatarsal bone. Do not interfere with the mass of nerves and muscles in the sole or in the palm.

CHAPTER XXII.

THE DISEASES OF THE TESTICLE, AND THE OPERATIONS PERFORMED FOR THEIR RELIEF.

This subject follows naturally after those diseases which we treated of towards the end of the first volume; the diseases of the testicle being intimately connected with those of the urethra.

The student of surgery would do well carefully to review the whole anatomy and relations of the testicle in taking up this division of our subject.

With the original seat of the testicle the sympathetic pains of this organ are related; with the coats the subjects of hydrocele and her-

nia : by considering the relations of the epididymis and vas deferens with the urethra, we ascertain the nature and origin of many of its diseases, and are enabled to distinguish local from constitutional diseases of the testicle.

Nervous affections of the Testicle.

The nerves of the testicle being of the class of visceral nerves, the sensibility of the gland is peculiar as well as exquisite. A blow on the testicle with a tennis-ball causes the patient to faint like a blow on the stomach. The testicle, probably from the same cause, is often the seat to which pain is referred, when there is no disease in it but only remote irritation. It will be found to be so tender, that the patient dare not let the clothes touch it, and yet neither swelled nor in any other way diseased.

[I have had a patient come round from the west of England, and landed from the Thames at the Adelphi Hotel, unable to bear a carriage or to walk, from sensibility of the testicle, while there was on visible or tangible disease of the gland.]

This sensibility of the testicle, with retraction of the cremaster muscle, is often attendant on a morbid state of the urethra, and removable by the use of the bougie.

[The patient has submitted to castration, a sad proof of the severity of pain. But that a surgeon should perform the operation a second time is remarkable : the source of pain not being in the part, it cannot be remedied by amputation !]

The scrotum is often the seat of this morbid sensibility ; that is to say, like the testicle it is affected by irritation of the bowels or of the internal organs. The pain felt is of a scalding sensation, and the thigh generally partakes in it. In the case of the scrotum and thigh being thus affected, the irritating matter is lodged in the lower part of the colon or the rectum.

[In these cases purging is of service, *e. g.* with the compound powder of scammony and the pulv. hydrarg. cum creta,—castor-oil with ol. tigllii,—enemata of tepid water. Cicutia with the blue-pill is given as an alterative.]

Hernia Humoralis—Swelled Testicle from irritation at the neck of the Bladder.

In this case there is neither metastasis nor translation of inflammation. It is occasioned by the inflammation of gonorrhœa spreading to the *caput gallinaginis*, and mouths of the seminal vessels. It may also be occasioned by a rude operation with the catheter or bougie. It sometimes follows lithotomy. Accordingly, the first symptom is not a soft swelling of the testicle ; but if you are observant, you will find the patient complaining of a pain in the spermatic passage, a sensation of fulness and of pain when he stoops, and an alarm that he has got a rupture. The next thing you ob-

serve is a protrusion and extreme sensibility of the globus minor, the lower part of the epididymis, and at the same time you may feel the vas deferens like a cord.

[It is not difficult to account for *strangury* sometimes attending this complaint, for, in truth, the swelled testicle is the result of inflammation running by "continuous sympathy" along the seminal vessels. The inflammation is traceable, although the effect is not so remarkable, unless where the vessels are accumulated in masses, as in the epididymis or testicle.]

The body of the testicle swells with great pain and tenderness, and in these circumstances the patient may lay his account with three weeks confinement.

By proper treatment it subsides, leaving some degree of hardness on the epididymis. The formidable consequences which sometimes arise from this very common case are, the total wasting of the testicle; or such a scirrhus on the epididymis as to obstruct the duct. The inflammation kept up by the continuance of the original cause lays the foundation of many of the affections which we have to describe.

Treatment.—The inflammation may be cut short by leeches and fomentation to the perineum, and a vomit. Afterwards leeches and fomentation to the testicle, then a tepid lotion with cerussa acetata and opium; the testicles to be suspended, and the horizontal position strictly enjoined; laxatives, and, in pain, Dover's powder, or pil. saponis cum opio.

In the chronic condition of the swelling, fots of the muriate of ammonia, the camphorated mercurial ointment, and ung. hydriodatis potassæ, with an alterative pill.

[Do not take the advice to bring back discharge into the urethra, by using a stimulating bougie, for the practice is founded on a wrong theory.]

Sclerocele.

Mr. Ramsden of St. Bartholomew's Hospital used the term *sclerocele* as indicating a chronic enlargement of the testicle, resulting from a continued lesser degree, or chronic state of inflammation in the urethra.

[Mr. Abernethy claimed the observations of Mr. Ramsden. It is important to us only as giving additional authority to the correctness of the pathological principle.]

I feel disappointed that late authors and lecturers have done so little justice to this author and to the subject. I must attribute this to a misconception of its real importance.]

The most formidable appearances of the diseased testicle are referable to this chronic inflammation. It is enlarged, heavy, knobby, and in part surrounded with water. The pain, too, is lancinating, and yet all yields to treatment which destroys the irritation of the urethra. To this end, the proper use of the bougie must be

added to other means, as blisters, and the seton in the scrotum, and the alterative mercurial course.

Scrofulous Tumour in the Testicle.

We distinguish the strumous tumour of the testicle from the more formidable disease of the body of the testicle. A pale, firm scrofulous tumour occupies the substance of the testicle, and presses aside the tubuli, and at length destroys the whole gland.

When the body of the gland is thus affected, there is reason for its removal, as the organ is useless; although the disease has nothing malignant in its nature, yet the operation saves the patient from a tedious local disease, and distress of body and mind.

Scrofulous Fungus.—In the sclerocele, the swelling is principally in the surrounding coats of the testicle. But the body of the testicle is liable to inflammation and suppuration in the strumous constitution.

In the sclerocele, and in all the affections of the testicle originating in the urethra, you find the epididymis indurated. But the inflammation of which I now speak is more constitutional, and commences in the body of the gland, and not in the appendages. Being strumous, it is very apt to be excited when the constitution has been debilitated by courses of mercury.

The inflamed substance of the testicle makes its way through the tunics, attended with a dark-coloured inflammation. It incorporates with the integuments—they inflame, open, and discharge some fluid, after which the substance of the testicle rises in a fungous tumour. The appearance now is very formidable, and like a bad carcinomatous disease; but it is comparatively innocent.

[We owe our more perfect knowledge of this disease to Mr. Lawrence, who showed that it did not call for castration. He cuts off the fungus, after which it cicatrises. I have generally treated it by escharotics, dry dressing, and strapping, which subdue the fungus, and the integuments close over it.

Proper medical treatment will be conjoined. Bark and soda, and sarsaparilla and iodine.]

Hydrocele.—Although the term means generally a watery tumour, it is confined to a collection of fluid around the testicle.

Although a consequence of the debility which follows inflammation, it is generally discovered by the mere size of the part, being unattended with pain. The swelling becomes tense, of a pyramidal shape, without discoloration, or at most with a slight enlargement of the veins of the scrotum.

[You understand the reason of the peculiar shape of hydrocele of the testicle. It begins by a collection of fluid within the tunica vaginalis; it begins therefore below, and as it extends upwards, it is embraced and moulded by the action of the cremaster muscle. You recollect also, that the fluid is anterior to the body of the testicle, and that the patient is sensible of the difference of sensation, when

you press or tap on the anterior surface of the tumour, and when you press behind where the body of the testicle is touched.

As the hydrocele enlarges, it is bound down by transverse and irregular bands, and becomes tense as a tennis-ball.]

You have to distinguish it from other diseases. The formidable fungous tumour of the body of the testicle most resembles it. When hydrocele has acquired a great volume, and shot up with a conical point into the abdominal ring, it resembles hernia. It is often combined with hernia.

[Its history, beginning below;—its transparency,—its peculiar shape, the testicle being behind, firmer, and giving pain on pressure,—the tumour suffering no change by the horizontal or upright position,—the irritation of the neck of the bladder,—the countenance indicative of no disease;—these are the signs of hydrocele.

In very old hydroceles, the tunica vaginalis becomes much thickened and even ossified.]

Congenital hydrocele.—In children, while the communication between the abdominal cavity and the vaginal cavity is still open, fluid collects in the testicle.

In this case you foment with the muriate of ammonia, liquor ammoniæ acetatis and tinctura lyttæ. Failing to excite absorption, press up the fluid into the abdomen, and assist nature in its tendency to produce adhesion in the neck of the sac by a compress.

You ought to perform no operation by puncture, as it would be equivalent to a wound of the abdomen, while the passage remains open.

I have found a hydrocele as a distinct sac attached to the epididymis; no doubt a consequence of the inflammation of that body, and in all respects like the next variety.

Hydrocele of the cord.—We find suppuration in the vas deferens, which marks how subject it is to inflammation, and how it is propagated; and this inflammation, I am inclined to believe, causes water to collect on the cord. Sometimes it is in one sac; sometimes in a string of vesicles. These cells often communicate, and part being exterior to the ring and part within, they sometimes puzzle us; as the tumour may ascend when the patient is in the horizontal posture, and again descend when he is erect.

But there is another form of hydrocele of the cord, which appears most frequently in children—a distinct sac. This is probably in consequence of some defect in the descent of the testicle.

Treatment of hydrocele.—When the accumulation of water on the testicle has been preceded and accompanied by irritation in the neck of the bladder and slight stricture, these should be removed and the usual means taken to excite absorption. As to the operation, there is, 1. the palliative operation; and 2. the radical cure.

The palliative operation is simply the puncture of the sac to let out the fluid, which, however, soon collects again. The radical operation is to evacuate the fluid, and to excite such an action in

the surface of the sac as shall effectually prevent the return of the effusion.

[I remember to have assisted at the operation by incision. This was the old practice. It was a severe but effectual method. A decided cut was made through the integuments and sac. The lips of the incision were kept apart by oiled lint, until the cavity was closed by process of inflammation and adhesion.

Another operation, now obsolete, is that by seton. The tumour was punctured with the trochar, and the water drawn off; a straight canula was passed through the larger one, and carried to the upper part of the sac. There being pressed against the interior of the sac, a needle with a seton was introduced through it, and brought out above. The canula being withdrawn, the skein of thread was left running in the whole length of the sac.

Another method was by caustic. The slough being formed on the scrotum, it was cut into, and the sac opened and kept open, till the cavity consolidated.]

The operation by injection is that which you will be called upon to perform; and, simple as it is, I have seen it so often ill done, and so often fail of its object, that I entreat your attention to one or two circumstances.

Cline advised a drachm of sulphate of zinc to a pint of water as the injection. I have seen this produce alarming and unnecessary pain. Port wine and warm water, in equal parts, is an effectual and manageable injection. Let it be tepid when you use it. You modify its effect either by increasing the strength of the injection or keeping it longer in the sac.

See that your apparatus is complete, and that the stop-cock and tubes fit, and are easily separated.

Fill the injection bag to the lip, and let there be no air; turn the stop-cock, and lay the bag in a basin of warm water, to be handed to you when you want it; for, having made the puncture, your hand should not be withdrawn until the operation is finished.

Take your lancet and make a puncture through the tough integument, rather a slight incision, avoiding the cutaneous vein.

Grasp the tumour, so that you compress the sides, and so deepen the quantity of water in front of the testicle. Plunge your trochar perpendicular to the surface, until you have fairly penetrated the sac; then depress your hand, and carry the point of the instrument upwards in the long diameter of the sac, by which you avoid touching the surface of the testicle.

Do not pull out the stilette, but rather push off the canula, by which you make sure that it is within the sac.

The fluid being discharged, your good sense will tell you whether the testicle is in a state to proceed. If you find it larger than you had reason to believe, tender on pressure and irregular, you had better desist and remain satisfied with the palliative remedy, and set about diminishing the morbid action in the gland. But if all be right then proceed.

Insert the nozzle of the injecting bag into the canula; take care that the end of the canula be not pressed against the body of the testicle; and take care that, if there be a hole in the canula, the hole is past the edge of the sac. (For I have seen the cellular substance injected from the hole of the canula opening upon the cellular membrane, while the mouth was stopped by pressure against the testicle.)

The sac being moderately filled, you wait patiently, or withdraw the nozzle of the bag, leaving the stop-cock in the canula. You let the injection remain until the patient feels the stimulus; but mark that he feels it in the loins, not in the part; another instance of those sympathies I bade you observe. From five to ten minutes by the watch will suffice.

[When the operation is clumsily and ill performed, the wine and water get into the cellular membrane of the scrotum; and inflammation and distress and sloughing are the consequences.

There is no necessity for powerfully distending the sac in this operation. Remember that the cremaster muscle may become spasmodically affected, and contract so powerfully that, in a very full sac, the injection may be forced into the cellular membrane.

You should inform the patient that the parts will swell, and that this is necessary to success; or on the third day he will be much disappointed in finding the tumour as large as before!

If the tumour rises keep him on the sofa and enjoin abstinence. If the swelling be not sufficient, let him have more liberty and live as usual.

Finding that the first effusion of fluid kept the surfaces apart, and was not absorbed, whereby the operation failed, I have passed a small piece of bougie through the canula, so that it remained in the wound when the canula was removed. Next day I have withdrawn the bougie, and squeezed out the serum. This insures the success of the operation, but it may produce too much inflammation.]

In hydrocele of the cord, I would prefer puncture or incision to injection; or you may draw through a seton along the cells; or puncture and evacuate the clear fluid, and then seize a part of the sac and snip it off.

You will hear it debated whether, in the successful injection of the hydrocele, the effect is produced by adhesion or merely by exciting a healthy action in the sac. In two instances, where I had an opportunity of examining by dissection, there was adhesion; and the medium of adhesion had changed into a perfect cellular tissue.

Hæmatocele is a tumour of blood within the coats of the testicle. If the surgeon touches the testicle in tapping, the blood flows into the sac, distends it, and presses back the body of the testicle. Some have imagined that blood may be poured out into the sac, independently of a puncture of the trochar. They think that the tension being taken off, the veins pour out blood. *Hæmatocele* may be produced by a blow.

The more formidable case of hæmatocele is that connected with a fungous spongy tumour of the testicle.

Varicocele.—This is a varicose state of the veins of the spermatic cord. It arises directly (like the varicose state of the saphena vein) from the distention of the vein, and consequent loss of the action of the valves. The tumour is very peculiar, and not to be mistaken—an elastic woolly mass, soft and compressible.

These veins swell in the erect, and fall in the recumbent posture. The mass is largest below or near the testicle. You feel that the softness or compressibility is derived from the pressure of a column of fluid. It is attended with a dull heavy pain, which the patient says he would willingly change for something more severe and sharp! It is sometimes attended with a diminution of the body of the testicle.

[Mr. John Bell was wont to operate on these veins, to expose them, include them in a ligature, and to cut off the projecting clusters. I have attempted to cure the complaint, by exposing the cord, and producing inflammation and condensation of the cellular membrane around the veins. But I advise no such operation. The application of a heated wire is in all respects a barbarous practice; it comes down to us from ignorant times, and is sanctioned by no just principle.

Avoid the cause, which is undoubtedly constipation and straining. Suspend the testicle, and contrive that the cord be compressed at the same time, at its exit from the ring, and in a sufficient degree to prevent the swelling of the veins. It is the gravitation of the blood, and the distention of the veins which cause the pain; if this compression be properly done, it effectually relieves the pain.]

Formidable tumour of the testis.—The true carcinoma of the testicle is a rare disease. It is difficult to distinguish it from scelerocoele. The weight, irregularity, knobiness, and stinging pain, are all accompaniments of the more innocent complaint. The uniform appearance of the tumour is owing to the fluid that accompanies the disease of the body. Through that fluid you will discover the hard and painful tubercle. It is this condition of the parts which, in the older authors, has the term of hydrosarcocele. The soft cancer, the pulpy testicle, is a frequent disease, and a fearful one.

The pulpy testicle is of the nature of fungus hæmatodes.—This disease attacks the body of the testicle. It produces a uniform tumour, an oblong sphere. It is elastic. It wants the accompaniments of hydrocele. I have been in consultation with our most experienced surgeons, when three opinions were expressed:—"It is water"—"It is blood"—"It is worse than all, it is a pulpy testicle, and the patient's life is measured." For, on looking to the countenance, I saw that sallow, yellow hue which accompanies this most formidable disease. The body of the testicle is first affected, then the epididymis, then the cord; the latter adheres to the pubis; the glands of the groin, too, are affected. By deep pressure, you can

feel the cord on the psoas muscle. The accompanying symptoms are, uneasiness in the loins—sensations down the thigh—œdema of the extremity—the countenance sallow; for the rest, vomiting and diarrhœa, hiccough, and abdominal pains and profuse perspiration. The disease has extended to the viscera. It will terminate life in a few months.

[With all these formidable characters, when, in an early stage it has been taken for hydrocele, and punctured, the puncture heals.]

Extirpation of the testicle.—This is an operation seldom performed in our hospitals. I remember when it was a very common operation; and this change I attribute to Mr. Lawrence's paper, and to the sclerocele, as an induration from irritation, being better understood.

[The cord is unnaturally thick. Is it the progress of disease, or the mere consequence of the bulk and weight of the testicle?]

Mr. Pott, we are told, ran a trochar into the tumour before commencing! This marks how imperfectly the pathological principle was understood in his time. It was to avoid cutting off a hydrocele with thickened coats!

Our incision is made in the length of the scrotum, and the cord dissected bare. The tenaculum is put through the cord, and given into the hand of an assistant, who at the same time, taking the cord between the finger and thumb, compresses it. The surgeon dividing the cord, dissects it down, and draws the tumour from the scrotum, which is quickly performed.

Now, taking the cord in his fingers, he lets the artery spring, and he takes it neatly up with his forceps: he loosens his hold again, the artery of the epididymis springs, and he takes it up in the same careful way.

[We find in old authors a fear expressed that the cord being cut across, it may be drawn up into the belly by the action of the cremaster.

A heavy tumour being cut off from the cord, the cord will certainly be drawn up, but this will not take place if you support the tumour before cutting the cord.

As to its being drawn up into the belly, you know that to be nonsense, since it does not go into the belly! nor can the cremaster muscle draw it farther than its own origin.

It is stated that a patient has died of hemorrhage from the cord being so drawn up. Then they must have forgotten their anatomy, since, if such an accident were to occur, you need only to slit up the spermatic passage!

However, it is to avoid this that we are advised to put a gross ligature through the cord. This I shall not object to. But most pointedly do I object to that ligature being considered as a *ligature d'attente*, to be tied if the hemorrhage should occur; for a ligature on the spermatic cord is attended with insufferable pain.

See that you secure the vessels of the scrotum, for they may bleed in the night, and distend the scrotum with coagulum.

The parts are simply brought together, and supported with compress and T bandage.

(See the *Classification of Tumours*.)]

We may here notice the *diseases of the scrotum*.

I have already observed that the scrotum is peculiarly exposed to nervous pains,—to sensations, which have not their source in the integument itself or the contained gland, but to intestinal irritation. This morbid sensibility is sometimes excessive.—(See *Bell on the Nerves, Appendix*.)

[Itching of the scrotum and neighbouring parts is a frequent complaint. In all these cases, too, look to the deeper cause, which in this instance is disordered function of the lower intestines, and then to the alleviation by external application. Make the patient bathe in a bath of bran and warm water,—cover the scrotum with an oiled silk bag, use a lotion of the liquor plumbi with cream. For eruptions, the zinc ointment: for irritation, the hydrocyanic acid in mixture of the bitter almond and the oxymuriate of mercury is recommended, but I avoid using poisonous lotions.]

The terms circocoele and varicocoele, and hernia varicosa are sometimes applied to the enlarged veins of the scrotum, cutaneous veins, as well as to those of the spermatic cord. Be at least aware that these cutaneous veins are subject to enlargement—that this distention is attended with an uncomfortable aching pain. Dashing of cold water, and the suspensory bandage, and free bowels, are all that is necessary to be done here.

[These veins are burst by falls or shock against the pommel of the saddle. A species of thrombus is the consequence. I have noticed the manner in which the scrotum is injected with blood after operation.]

The scrotum is subject to a peculiar form of cancerous disease, called the *soot-wart*, (see Pott's works,) chimney-sweep's cancer. I observe Mr. Syme says it is not known in Scotland. I have seen it only in the hospitals of London, but I must imagine this to be accidental. The sore begins on the lower part of the scrotum. Unfortunately a sore of the skin, if there be any thing malignant in it, is very soon propagated to the neighbouring lymphatic glands—and so it is here. The glands of the groin are early affected, and when they partake in the disease the patient is lost.

The disease makes progress in two ways; it is propagated through the absorbing system, and the sore eating deep infects the testicle. When the testicle becomes enlarged and firm, and adhering to the diseased scrotum, the spermatic cord, the glands of the groin, and viscera of the abdomen are infected, and the patient is past all hope. ☞ Early excision of the diseased skin is the practice recommended. But even that gives no security.

The scrotum is subject to morbid enlargement, and I have seen it resting on the ground an enormous mass! When the growth is excessive, there is no reason why it should not be removed. The disease is not malignant; it is a mere hypertrophy. The objec-

tion is in the size of the mass, and the consequent danger of hemorrhage.

[Were it to be performed, I think the aim of the operator should be to lay bare the testicles, and seeing that they and the penis were safe, to cut with determined strokes, an assistant being prepared to grasp the bleeding surface.

As to palliating, be it remembered that it is at last the pendulous condition of the parts that produces the rapid effusion and growth; therefore, the mass ought to be supported in a sling, and subjected to regular process of compression.

The scrotum, as a depending part, is the seat of anasarca. It may be necessary to puncture it with the needle or lancet.]

I drew up the following note as part of a report on Cancer, required by the governors of the Middlesex Hospital.

CANCER OF THE TESTICLE.

The cancer, or true carcinoma testis, is a rare disease. The cases sent into the hospital as such, have been cases of scirrhus; that is, of induration of the coats of the testicle, or of irregular tumours, or cysts attached to the cord and epididymis.

The soft cancer, pulpy testicle, or cephaloid tumour of the testicle, have been more common; however, the cases presenting in hospital practice have not borne the same proportion to those occurring in private, as in other formidable diseases.

Those suffering from this disease, or those diseases, if they be distinct, have died; indeed the death has not properly been attributable to the disease of the testicle. The fungous testis has been the outward or visible sign of a more general diseased state of the viscera.

This disease, in my opinion, belongs to the scrofulous constitution. It has shown itself in persons of a dark ruddy complexion, and black hair.

It has most frequently occurred in men about fifty years of age, although I have preparations exhibiting the disease in young people.

It has not been traced to direct injury, or to irritation in the bladder or urethra; and the examination, after death, has shown a disposition in the viscera and lymphatic glands, and even in the lungs, which could not be traced as a consequence of disease in the *testis*.

It is distinguished—1. By beginning in the body of the gland; 2. By the elasticity of the tumour; 3. By its greater regularity of form than in the tumour of hydrocele; 4. By the enlargement of the veins of the scrotum—(they are numerous, turgid, and distinct, not varicose); 5. By the tumour having no transparency; 6. The body of the gland is not to be distinguished apart from the tumour; 7. The peculiar sensation at the back and lower part, which marks

to the patient the presence of the body of the gland in hydrocele, is not experienced here.

Prognosis—in the highest degree unfavourable. The only hope is, that we have mistaken the nature of the disease. To ascertain this, the surgeon conceives himself at liberty to use the lancet; and when, instead of water or liquid blood, there is forced out a soft brain-like matter, the case is of the worst character.

It resembles *hæmatocele*; so, if the condition of the veins on the surface do not mark the difference, a puncture will ascertain the nature of the swelling.

It is distinguished from the scrofulous testicle by its uniform elasticity, and by the absence of all caking or irregular hardness of the integument.

When in the advanced state of the disease, and when the tumour is about to burst, it has some resemblance to the suppurative state of the scrofulous testicle; yet an experienced surgeon will detect it by the smooth and elastic swelling of a part of the tumour, accompanied with a dark brownish-red colour.

When it breaks a bloody fluid exudes, but the tumour does not immediately subside, as on the evacuation of the matter from a suppurating testicle.

Sometimes this partial enlargement, with dark and glazed skin, will subside and shrink, without breaking; and another part of the tumour will assume the appearance of ripeness in the same manner.

When the tumour becomes large, and shoots up into the abdominal ring, it then receives an impulse from coughing, which might betray the surgeon into the belief that it was a hernia.

I have seen it mistaken for hydrocele,—a scrofulous testicle,—a *hæmatocele*,—a hernia.

When the abdomen becomes swelled and tense, showing that effusion has taken place, then we have to suspect that the disease has affected the lymphatic glands, or the viscera of the abdomen. The patient will not long survive this condition.

The *chimney-sweepers'* cancer has not been seen in this hospital in the course of many years, with the exception of one case in 1823, when the glands of the groin became affected, and ulcerated, and at length opened the femoral artery!

The scrofulous suppurations of the body of the testicle, attended with rose-like granulations, have frequently assumed the appearance of cancer; but they have yielded to the caustic and compression, and have sometimes been treated by the excision of the fungus.

In some cases, this form of disease has followed a course of mercury, a scrofulous diathesis having been the consequence of the protracted use of this medicine.

CHAPTER XXIII.

OF HERNIA.

Here a grave duty is imposed on the surgeon. We have a class of accidents that terminate fatally if assistance be not promptly given. When the utmost danger threatens, the patient may be saved by a skilful hand. But that skill and the promptitude necessary on the occasion, must be acquired by much diligent study and some experience.

Certain principles must be laid down.

I limit the subject to the escape of a bowel,—a protrusion from the abdominal cavity.

Study then the inflections of the peritoneum, and the quality by which it shifts and accommodates itself. Consider its nature as a serous membrane subject to inflammation and ready adhesion,—how it expands and how it thickens.

Observe all the passages through the abdominal walls by which a bowel, carrying before it the peritoneum, can escape, and then proceed to the surgery.

The varieties are,—

[1. *Hernia through the spermatic passage*.—Inguinal hernia, —Bubonocoele,—internal-oblique,—ventro-inguinale or direct,—scrotal (oscheocoele)—congenital.

2. *Under the crural arch*.—Femoral or crural hernia (merocoele.)

3. *By the umbilicus*.—Exomphalos or omphalocoele, or umbilical hernia.

4. *From any other part of the abdominal wall*.—Ventral hernia.

5. *Internal hernia*.—Through the ischiatic notch,—through the foramen ovale,—through the diaphragm,—hernia in the vagina,—hernia in the perineum.]

Peritoneal Sac of the Hernia.

The bowel breaking through the cellular connection, and escaping through the passage of the abdominal wall, always carries the peritoneum before it; and the peritoneum, variously affected by this violence, forms the inner covering or proper sac of the hernia. You must have observed how readily the peritoneum shifts and is distended,—in pregnancy, ascites, and the natural movements of the viscera, so with more or less violence, it now passes out of the abdominal walls to invest the protruded parts.

In a recent bubonocoele, it has its natural appearance; in an old scrotal hernia, it acquires density and substance very different from its original state. In a congenital hernia it is fine and thin. In an umbilical hernia it is irregular, and in part absorbed. In a femoral

hernia it is so fine that the operator thinks he touches the gut when it is still invested with the sac !

Nor is the peritoneal sac always the same throughout. It is often thin at one part, and thick at another ; and these changes, from the natural appearance of the peritoneum, must be attributed to the degree of pressure or violence which attend its displacement. It is above all necessary to notice, that, where it is embraced in the narrow passage or neck of the hernia, it is often condensed in a manner unlike its original condition ; and that the effect of inflammation and pressure upon it, is to make it capable of strangulating the intestine, and consequently puts us under the necessity of dividing it in the operation.

The mouth of the sac being thus condensed, when the hernia is further protruded, and the sac stretched, it produces an inequality in the tumour, by dividing it with a band in the middle.

All this I had to contend for, long before the publication of Mr. Lawrence or M. Cloquet. The "stigmata"—"fibrous edge"—"thin cutting edge"—of the sac, need not have been quoted as the observation of a foreign pathologist.

[A double sac is a rare occurrence, but it takes place in this way : the neck of the original sac contracting and adhering, without the proper outlet of the muscles or their tendons being also strengthened, a new protrusion of the intestine causes a further shifting of the peritoneum, and a new portion is pushed down within the original sac.]

Condition of the Intestine.

Here is another subject which I found quite neglected, touching a most important point of practice—the distinction of *incarceration* and *strangulation*.

For the most part a rupture forms slowly ; there is a certain progress made before the case is declared by external tumour. In the case of bubonocoele, a finger-like process of the peritoneum is pushed through the spermatic passage by the omentum or intestine ; which parts are in all probability protruded and withdrawn many times before they burst from their natural boundaries. That this takes place in some cases I have ascertained by dissection.

When the intestine is protruded into a narrow passage, there is nothing to prevent its being withdrawn on the next peristaltic convulsion of the gut. It is when it escapes from the narrowness of the aperture that it swells up, and cannot be withdrawn. It is this *escape from pressure* which should chiefly attract your attention. It explains every thing.

I was wont, at lecture, to make a noose, and push a piece of intestine through it. It was easily withdrawn ; but when the flatus was pushed into the portion within the noose, it could not be withdrawn ; thus showing that it is the distention of the gut that causes it to be retained.

Something of the condition of the gut will, therefore, depend on the passage through which it escapes. For example, when the intestine escapes under Poupart's ligament, the crescentic arch causes it to take a very acute turn; and the intestine beyond being permitted to fill, and being at the same time drawn by the action of the gut within, it comes immediately into a dangerous condition. If, on the contrary, the passage is wide and long, and does not terminate abruptly outwards, so as to let the gut expand itself, it does not suffer, and at any time may be easily reduced.

[The bladder of urine is sometimes in the hernia; but no one ever heard of a strangulated bladder; because the intestine strangulates itself. Fully to comprehend this subject, you must draw a distinction between *irreducible*, *incarcerated*, and *strangulated intestine*.]

The intestine may be *irreducible* from adhesion to the peritoneal sac. The mass protruded may be so large and so conglomerated, that it cannot be reduced, or, if reduced, cannot be retained.

But incarceration is a different condition. When the portion of intestine escapes, and is freed from pressure, the flatus and fluid contents accumulate within it, so that there is an angle of reflection made by the intestine. A certain difficulty in the return of the blood produces turgescence of the coats of the intestine; and finally, mucous secretion is poured into the cavity of the intestine. These together give to the portion included in the sac a bottle shape, and make it difficult to reduce it. In order to its reduction, or, as it is termed, to the operation of the *taxis*, it must be compressed, diminished in its bulk, and the flatus and mucus squeezed from it.

But the distention by mucus and flatus may be so great, and the angle between the body and neck so acute, that the matters contained cannot be carried back into the canal within the abdomen. The canal is consequently obstructed; this causes the symptoms which authors ascribe to strangulation. The intestine in the sac is not strangulated, the circulation is still free; this portion may live, and the patient may survive for weeks, suffering the while all the consequences of obstruction of the bowels.

The case in which the symptoms of danger are present, and yet the patient survives them, is,—where the intestine is surrounded by the omentum; for then, while the bowels are obstructed and the symptoms present, the intestine is supported and protected.

The secretion of the sac does sometimes produce a similar effect; for the secretion of serum from the peritoneal sac, and from the exterior surface of the intestine, so fills the sac, and compresses the included intestine, that it is not permitted to fill, and is not therefore strangulated.

Strangulation is another stage—another condition altogether. It is that state where the neck of the intestine is so sharply compressed, that not only the contents of the intestine cannot pass, but the veins are compressed—the circulation in the portion of the gut is stopped. How long, then, may a man live with *strangulation*?

Suppose I take up the last work on the subject—the last authority—I find, “I succeeded easily in reducing the hernia, which had been strangulated two days.”—(Tyrrel.) Mr. Lawrence speaks of a slow strangulation. Sir Astley Cooper says, if he had hernia strangulated for six hours, he would have the operation performed. Professor Syme says, “Mortification rarely takes place sooner than eight hours, or later than eight days.” All this is very loose, and arises from not distinguishing the cause of symptoms, and the difference between obstruction to the canal, and obstruction to the circulation in the portion of intestine within the hernia.

[It was in attempting to decide how long a piece of intestine would continue without circulation in it, and recover, that I found the ligatures carried into the canal, and the animal recover without apparent suffering !]

I cannot say how long an intestine will live after the circulation is stopped in it; half an hour would, I conceive, determine the matter.

Now you understand, what by cases I long since proved, that the violence of symptoms of strangulation is no criterion to judge by; that this depends on the obstruction to the descent of the contents of the intestine, and not on the state of the intestine in the sac; and that with the same symptoms, one patient may live for five days, and another have his fate determined in as many hours.¹

¹ On this subject you may read a paper by Sir Everard Home (Transactions of a Society for the Improvement of Medical and Surgical Knowledge, vol. ii.) Home had great influence in forming the opinion of the profession at one time. His ideas are incorrect and confused in a painful degree. He ascribes the difference in symptoms which are to decide our practice, to the state of the intestine included in the sac. For example, “When the stricture is only sufficient to compress the intestine, and to prevent the contents from passing through the strangulated part, there is vomiting, hiccough, thirst, and general uneasiness,” &c. “When the stricture is in so great a degree as to produce inflammation on the compressed part of the gut, the symptoms come on immediately,” &c. &c. “When the stricture is so tight as to obstruct the circulation of the blood in the part, all these symptoms are met with in the greatest degree,” &c. This is very vague.

By such statements and such opinions, the principle which is to govern us is quite obscured. When a small portion of gut is strangulated, and so sharply nipped as to be quickly mortified or ulcerated through, like an artery under a ligature, the symptoms are very often less distressing, less marked, and less likely to give alarm, than when a portion is included in a mass of omentum, and comparatively safe.

The question turns on this.—Do the symptoms arise from the state of the gut in the hernia, or from the state of the canal and stomach above the part strangulated? Now this is determined by the symptoms of obstruction of the intestinal canal from other causes; by which it is shown that distention, the consequent excitement of the muscular coat, the consequent pouring out of secretion into the intestines, and the derangement of stomach, produce those very symptoms which attend strangulated hernia.

Accordingly, the symptoms will often be rendered milder, and the life prolonged, by the ease with which the stomach ejects its surcharge. By the inverted action and vomiting of stercoraceous matter (though always alarming) the distended canal is in a certain measure relieved.

Symptoms of Strangulation.

There is a dragging down, with sickness, when the intestine becomes engaged in the neck of the sac; the lower portion of the intestinal canal is excited, and there is generally a motion; after which there is obstinate constipation. Then there is distention of the belly, hiccough, vomiting; the belly swells and is tender. Towards the region of the abdomen, where the hernia has taken place, or in other words, near to the neck of the sac, the parts are very tender. If unrelieved, the features become pinched, the pulse intermitting, the breath is offensive, and the vomitings stercoraceous.

[The pain comes in paroxysm. It begins with a twisting or rolling sensation in a distant part of the belly, coming to the place of stricture, where for a time it is severe and stationary. It relaxes, there is an interval, and it begins again.]

It is important to notice that these symptoms are consequent on distention of the canal and obstruction to the descent of the fæces; that they may be all present while yet the gut in the sac is safe; that they may be absent or mild, and the intestines irrecoverably gone!

Practically, therefore, we come to the question, What is it that should alarm us, and make us have recourse immediately to operation?

To this I would answer, that I chiefly consider the state of the tumour; and when we are certain that it is a hernia, and that the efforts to reduce the gut have failed, and the tumour is tense, and the part above the neck of the sac tender, I would not delay the operation a moment; but immediately explain to the patient the danger he is in,—a danger from delay, not from the operation.

[Is the danger of the operation for hernia nothing, and is it then altogether in the state of the gut? Would the operation on the parts, in a state natural and undisturbed by pressure, be attended with no bad consequences?

It is a very natural question, and it has been decided; when the operation for strangulated hernia has been performed, without urgent symptoms declaring a necessity for it, the operation has proved fatal.

The explanation is this: it is a penetrating wound, the con-

However, let me not push this view too far. Symptoms will arise from the state of the gut (meaning the portion in the hernia). This is evinced by the sympathy of the stomach with the gut in the moment of its descent.

In the same volume of Transactions quoted, p. 305, we have a case of hernia, with obstruction for eight days, where the sac mortified, yet the patient recovered. "Vomiting foul matter, hiccough, cold extremities, hard, quick, contracted, pulse," and, notwithstanding, the intestine in the mortified sac recovers. Is not this a proof that the *symptoms* arise from the condition of the bowels within?

tinuity of the peritoneum is broken, inflammation of that membrane is set up.

But there is something in the circumstances in which the operation is called for, which makes this danger less. The neck of the sac is excited,—the intestine is excited, almost inflamed; and when the gut is reduced, it readily adheres, and the mouth of the sac is closed. And we before observed, that when a penetrating wound closes, the danger of peritoneal inflammation from this cause is over.]

The danger, therefore, in hernia is from delay, and principally from permitting the ineffectual working of the distended intestines to bring them into a state of inflammation.

Appearances on dissection when the patient dies unrelieved.—It is in the dead body that the appearances indicate the nature of the danger and the means of relief. On opening the abdomen, you find some turns of the intestines (which, from their size, you might imagine to be the colon) filling the cavity. They are of a dark bluish-red colour. You trace them down to the stricture, and you find the intestines there glued together by coagulable lymph; and on their surface flakes of pus, and here and there black spots of mortification. There is serum in the general cavity, and on turning up the distended intestine some convolutions are observed contracted and paler. These belong to the portion of the intestinal canal between the stricture and the anus.

Acute and Chronic Hernia.

The terms are misapplied, yet some explanation is necessary under this head. Whether hernia be hereditary is an idle question; but it is important to know that there are various degrees of congenital defects in the abdominal muscles, from the total absence of the abdominal muscles, to that state of the umbilicus or ring, in which they are a little relaxed, and wider than natural. When the passages are relaxed, and they are apt to be so in people of a sedentary habit, a rupture appears threatening, and slowly it increases. Such a rupture is easily reduced, and there is little danger of strangulation, and if symptoms show themselves, time is given for consideration and for measures of relief.

But, on the other hand, when a vigorous and active man, with no looseness of texture in these abdominal passages, has a rupture or hernia come down suddenly, during some powerful effort in which the abdominal muscles compress the intestines, a small portion of intestine pops out through a narrow passage! Then dangerous symptoms commence on the instant of the accident, and without assistance, he is lost in a few hours.

Thus it happens, that in a man while mounting on horseback, or playing at tennis or golf, or in a sailor with his hands on the tackle of a gun, and his foot on the carriage, straining in a state of high excitement, a portion of gut is protruded: the symptoms run a

rapid course, incarceration and strangulation come on quickly, and in a few hours he is past assistance. The effect is a consequence of a mechanical cause; the terms chronic and acute, as we use them, are not applicable to the case.

OF INGUINAL HERNIA.

Bubonocoele. Common oblique Hernia. Vento-inguinal Hernia.

After these preliminary remarks, I need only say, that you find a colourless and elastic tumour projecting from the abdominal ring. If you press it moderately, there is a gurgling noise, and it recedes. It ascends when the patient is laid on his back; it descends when he is erect. It receives an impulse when he coughs.

But it may happen that the patient cannot reduce it, as has been his wont; it is becoming hard and painful, and the surgeon's hand is required.

The taxis.—This is the operation of reduction by posture and the pressure of the hand.

[Lay the patient on his back, put a pillow under his hips and under his shoulders, so that the spine may be curved, and the abdomen relaxed.

Now grasp the whole tumour; you are not to stuff it up, but to compress it gently, and for some time. Instead of pushing it up, you draw down and smooth the neck of the tumour.

If you push it towards the ring, you double or twist the neck of the sac; so that reduction is impossible! Smooth it down as if you were "milking the sac;" and at the same time compress the whole tumour.

If you hear a gurgle, you are going to succeed; the flatus is escaping into the intestine within the stricture: the intestine in the sac will presently be flattened or emptied, and then the intestines within will pull it up.

When it is empty, you may then follow the rule to push up, first, that which came down last. This attempt to push up the intestine succeeds—not by pushing it up, but by exciting it to be drawn up, by urging the intestines to action.

I do not like failing in this mode of operating, it being the best and most effectual. It requires patience and *tact*, for a little too much pressure, and all is lost. In this stage, it is usual for our house-surgeon to send for the surgeon of the week, and in the mean time to bleed the patient, and put him in the warm-bath. The operation is to be attempted again while he is in the bath. Avoid purgatives, and order very large purgative clysters. I do not recommend the tobacco clysters. Putting ice to the tumour is nonsense: do not persuade yourself that you are doing something for your patient, when you are losing precious time. If you fail by the means described, urge the necessity of operation.

I am unwilling to load these pages with cases; yet the following

statement may bring you to reflect on the danger of attempting too much by the taxis. When I was surgeon of the Royal Infirmary here, before going to London, a case of bubonocoele presented, which I could not reduce, and, as was the rule of the house, I called a consultation. When the consultants met and went into the ward, the house-surgeon came forward with a glow of triumph in his face. He had saved us the trouble, he had reduced the gut; and so he had, and the tumour was gone. Next morning this man died in great agony; and on dissection, I found the intestine burst just where it had been nipped by the stricture! The folly of the young gentleman needs no comment.]

Radical Cure. Obliteration of the Sac.

It is a frequent question, "What hope is there of a radical cure? Must I always wear this very unpleasant thing?" The umbilical hernia certainly disappears. When the truss is used in children, and perseveringly applied, we find hernia at the groin disappear; but in adults it is not to be expected, and hardly to be wished, since the process is not without danger. What is to be apprehended, is the partial adhesion of the neck of the sac, and the condensation of the margin, by which it acquires a sharpness and a firmness which prepares it for strangulating the intestine when it accidentally descends.

The effect of the powerful pressure of the truss is to cause an absorption of the fat, which should in part fill and guard the passage. Against this, I fear there is no resource, but in accommodating the machinery so as to retain the intestine in its place without pressing too severely. Procuring adhesion in the neck of the sac is no security against the return of the hernia. If the tendinous texture be imperfect, the peritoneum will yield to impulse, unless supported by the truss.

[Instead of elastic pads, firm blocks are sometimes used, with the intention of producing adhesion in the neck of the sac. To be safe, they must be very nicely adjusted. Some attempts of ingenious but ill-educated men in France have been directed to the cure of hernia by obliterating the whole sac. Such attempts cannot be made without danger.

Attempts have been made to cause the contraction of the passage, and the obliteration of the sac, by the application of astringents: they avail nothing. Caustics are highly dangerous, and not for an instant to be thought of.

Long confinement to the horizontal position, and the prevention of the descent of the hernia, may do much; but it is too heavy a price for a bare possibility. Yet, if there should be confinement to bed on some other account, the opportunity should be taken to give the chance of a radical cure. Yet let us recollect, that whatever change may be wrought on the peritoneal sac, there can be no permanent safety as long as the form of the ring is imperfect; and

no practice can make perfect the tendinous filaments of the abdominal muscles.

I must take this occasion to show that *mortification* is not all you have to fear in a case of hernia. Without the circulation being cut off, the stricture at the mouth of the sac is sometimes so abrupt and sharp as to ulcerate the intestine (as a ligature cuts an artery;) and by pressing the tumour too much, the tender gut is forcibly raised against the stricture, and may be burst. Whenever, therefore, the neighbourhood of the sac is tender, prefer the operation with the knife.]

The truss.—But let us presume that the operator has been successful, and has reduced the intestine. How is it to be retained? Keep the patient in bed before you put on the truss: be well assured that there is nothing in the sac: see that it does not press on the os pubis, nor compress the cord against the bone. Having applied it, make him get up and walk about; make him cough; feel that no part of the intestine slips down: give him proper precautions; for example, that when he feels that it has slipped, and the gut has descended, he is immediately to retire and throw himself down, nor rise till the gut is again reduced.

At night the truss may be dispensed with, or one with a weaker spring employed.

Here the management of his bowels is to be insisted on. You give him proper laxatives. You enjoin the use of the lavement, and that he is on no account to strain at stool.

[I must again add, that, when a patient has long and effectually worn a truss, he is in danger on a return of the hernia; because adhesions have made the passage smaller; pressure has condensed the neck of the sac, so that, when the intestine has come down, it is in some danger of strangulation.]

The Operation for Bubonocoele.

You have beside you a scalpel—straight and curved probe-pointed bistoury—forceps—directory—tenaculum. You look round for the proper apparatus for dressing—needles, strapping, lint, compress, double-headed roller, and the utensils which are necessary for all operations with the knife, as sponges and tepid water. The parts are previously shaved with a sharp scalpel.

Begin your incision above the neck of the tumour, carrying it some way down the face of the sac. You may take the skin up with your finger and thumb: your assistant does the same. Pinch pretty hard, and divide the ply of skin which is between you with the scalpel; the pain is nothing. If you have calculated well, the incision is of sufficient length, and you may begin your dissection of the superficial fascia: the deeper fascia: the cremaster muscle. These lie in layers over the peritoneal sac, and a clever hand needs only the forceps and the scalpel.

When you come to the sac, you had much better raise the cellu-

lar membrane with the forceps; cut it by carrying the knife horizontally. When the layer is open, run your directory under it in the whole length of the part of the tumour which is exposed, and run the scalpel along its groove.

Now I would lay aside the scalpel. You are about to open the proper sac; do it by pinching up the sac with the forceps, and cutting horizontally with the probe-pointed bistoury. The serum spouts out and announces the opening of the proper sac.

You have some anticipation of the result of your operation by the colour of the fluid: if pale, it is favourable; if bloody, unfavourable. But there may be none, and that is the reason of your proceeding so carefully in opening the sac; the intestine may adhere.

While the fluid is escaping, you introduce the probe-pointed bistoury, and slit up the sac.

You now examine the intestine. It is not like what you have been accustomed to see; it is rosy-red. It is in fact gorged; but you see the vessels on its surface, and that it is alive.

Do not let the intestine escape from the sac, but introducing your little finger, use it as a directory, and open the sac up to the strictured part. But use the finger no farther; do not attempt to bore in the finger by the side of the intestine, but take the directory. See that the directory passes into the abdomen. Let your assistant guard the intestine with the spatula or a card; take care that it does not rise up over the edge of the bistoury. Introduce the probe-pointed bistoury, and resting the point in the groove of the directory, raise the handle; do not saw or cut, but simply separate the instruments, by which the firm tendinous parts will be cut, and nothing more. Let this part of the incision be directly upwards.¹

If you now put a warm sponge on the intestine, you will have the satisfaction of seeing it assume a brighter colour.

Now, pull it gently down about three quarters of an inch, then gently compress it; the flatus and fluid within it pass up. If this does not take place with slight pressure, the stricture is not relieved; you must touch it again. When the intestine is empty, you gently press up the part nearest the neck of the sac, first with one forefinger, then another, doing no violence.

[The meaning of pulling the intestine down, is to bring the tender part of the intestine out of the stricture, lest it should suffer when you empty the intestine by pressure.

I have seen the operator push his finger violently in, as if he were stuffing a sausage. On dissection, I found the mucous coat of the intestine quite cut through (just as the ligature cuts the inner

¹ In this part of the operation, especially in small hernia, you should have bistouries which cut only at a small portion of their edge; one which is sharp for a quarter of an inch near the point, another which does not cut for an inch of its length from the point, and is sharp only for half an inch.

In the event of an internal stricture, these instruments are of the greatest use.

coat of the artery.) The preparation is in the collection of the College of Surgeons.

On reducing the intestine, serum perhaps runs from the abdomen; this is a bad sign, since it indicates great excitement of the intestines within the abdomen.]

The intestine being reduced, you dress your patient carefully. Most surgeons use a needle to bring the integuments together; (I never did.) Support the ligature with adhesive straps; place a compress; over this a larger strap; then a folded cloth or napkin; and secure all by the double-headed roller.

Put the patient's hand over all, and tell him to press when he coughs, or on any exertion. Order a clyster, and compose him with a pill of calomel and opium.

If pain arise in the abdomen, use fomentations to the belly; and if not assuaged, you must have recourse to leeches and blisters. It would appear from Mr. Travers, that, at Guy's, they give half an ounce of sulphate of magnesia in infusion of roses, and repeat this hourly until stools are procured. Such is the practice with many surgeons. The reason of my practice in preferring large clysters, and calomel and opium, is, that the intestine above the stricture is already overwrought, and, from that cause, is in danger of falling into fatal inflammation. If twelve hours should pass without relief to the bowels, I would yield to the general direction, and give purgatives. If, however, there are no evacuations procured, it will be found to be a consequence of the inactivity of the portion of intestine which had been down in the sac, and that inactivity produced by the injury it has received; when it does not recover its function, the peristaltic motion is interrupted there. The universal opinion in favour of purgatives, is a consequence of observing the happy consequences of stools spontaneously following the operation. It is a very different matter when they are procured by active purgatives.

Clysters are used, not to evacuate the large intestines, but to soothe and to draw on gently the activity of the upper part of the canal; to excite, without the possibility of injury to the portion of the intestine which has sustained injury.

[As an example of the accidents which render the case intricate, read the account of a second operation by Mr. Foster, of Guy's Hospital, *Med. Chir. Trans.* vol. v. p. 232. The intestine had been reduced within the outer ring, but incarcerated by the internal ring. In the same paper, there is a notice of a similar consequence from the same cause in femoral hernia.]

Scrotal hernia.—The scrotal hernia, in respect to the anatomy of the neck of the sac, is the same with the bubonocoele. It is the bubonocoele, when the protruded parts have descended into the scrotum.

In these large hernias, the strangulation is more particularly the effect of congestion in the intestine. Very often another turn

of intestine is pressed down, and lies in the same passage with the first, and this second portion becomes strangulated.

[In my earlier attendance on the Middlesex Hospital, I saw the incision made in the whole length of the tumour! and all the intestines exposed. This is a great mistake, for they roll out among the surgeon's hands, and he knows not where to begin with the reduction. Groping and handling these intestines, turning them over, and trying the reduction first of one portion then of another, is certain death to the patient.]

My practice, when the scrotal tumour was very large, was to dissect round the neck of the sac,—to feel for the band of the ring which girded the sac,—to put my probe-pointed bistoury flat under it, and turning up the edge, to divide it, and then to attempt reduction.

If on gentle trials to evacuate the flatus from the intestine I did not succeed, I made a small opening into the neck of the sac, and divided the stricture from within; taking care to expose the mass of intestines as little as possible, and not to let them turn out among my hands.

Congenital Hernia.

The congenital hernia is also a hernia through the spermatic passage, coming out through the abdominal ring. I consider it dangerous when the subject of an operation. The intestine has directly followed the testicle in its descent, and lies in the vaginal coat. Two circumstances are peculiar here: the sac is thin and elastic, the neck of the sac is peculiarly dense, and the stricture sharp. The latter circumstance I attribute to the attempt of nature to close the passage, balked by the presence of the intestine.

[The operation is the same with what has been described. The elasticity of the sac is more apt to turn out the intestine when the incision is made. You must be very tender in treating the stricture.]

In the *direct or ventro-inguinal hernia*, the only circumstance peculiar is the neck of the sac; it does not lie obliquely in the spermatic passage, but comes out direct, pushing the epigastric artery towards the outside. It is this hernia which splits the spermatic cord, and sometimes carries the vas deferens on its anterior surface.

[Hence you perceive why you cut the stricture in all cases of hernia through this passage directly upwards. You, perhaps, ought to form an opinion before operating, whether the hernia be direct or oblique; yet it is presumption to proceed upon that knowledge, and, therefore, you cut so as to avoid the epigastric artery, whether it climb on the outside or on the inside of the neck of the sac. You perceive another reason for being cautious in the dissection of the fore-part of the tumour,—the possibility of dividing the vas deferens.]

Of the Femoral Hernia.

The crural or femoral hernia is that which comes down under Poupart's ligament, and rises from the hollow in the thigh round the crescentic arch. It is more frequent in women, owing to the form of the pelvis.

[These parts have, I trust, been your study. You have observed the course of the vessels to the thigh—their sheath—the reticulated texture through which the lymphatics of the thigh pass up. You have marked the course of the epigastric artery—the possibility of the obturator artery going off from it. You have, in the dead body, passed your finger in the course which the femoral hernia takes, and have observed where it comes out under the crescentic arch. Having this knowledge of the anatomy of the parts, the surgery is comparatively easy.]

When the gut comes down into the thigh, it is forced up upon the tendon of the abdominal muscle, so that I have seen it mistaken for a bubonocoele.

[This is of consequence in the operation of the *taxis*; for, instead of pushing the tumour up, it should be pressed down. Lay the patient as before described—raise the thigh—turn in the toes—compress the tumour generally, pressing rather downwards—continue the pressure, gradually increasing it—when the tumour yields, change the direction of the pressure, so as to turn it round under the crural arch.

In all cases, but especially in the small femoral hernia, we are apt to be deceived by the diminution of the tumour under pressure: when it is not owing to the return of the gut, but the diminution of the quantity of serum in the sac.]

Operation for Femoral Hernia.

Things being prepared as described for the bubonocoele, you make your incision direct on the tumour.

[In some cases of hernia, I have thought it right to lift up a flap of the skin, with a view to its falling down, after the operation, over the opening, and receiving the compress; but this may be left to the surgeon's fancy—there are matters of more consequence.]

The first incision exposes the inguinal glands, which very often project from and obscure the hernial tumour. Avoiding them as much as possible, you dissect down to the sac. Now you find a round smooth tumour; you carefully open it, and slit it up. You then find the peritoneal sac, so transparent that the intestine is seen through it, and so like is the appearance to that of the intestine, that many a surgeon has reduced the whole. But you, knowing the peculiarity of the peritoneal sac of the femoral hernia, take the part between the finger and thumb, and you will feel that the peritoneal sac is not yet opened, that there is a nucleus within. You

open it with great care, when the fluid escapes, and you discover a small knuckle of intestine.

Here it is that, from the depth of the parts in the angle of the groin, and from the smallness of the whole, you feel the use of finer and smaller bistouries than those in common use. The finger can here be of little service as a directory: you carefully defend the intestine, (repeatedly I have seen it cut,) and introduce the directory. The rest of the operation is performed in the manner described; you cut directly upwards, and little is required. It is the neck of the sac, and the sharp edge of the crescentic arch, which require to be cut.

Treatment of the mortified Gut in Hernia.¹

The gut being found dark-coloured, and to appearance mortified, you inquire if it be possible that the violent pressure in the operation of the taxis has caused extravasation? I have seen ecchymosis from this. You touch the surface with the lancet—it does not bleed. In this case it must not be returned.

You open it freely. You put your finger within the gut, your sharp bistoury without the gut, and you undo the stricture, so that the contents accumulated in the portion of the intestine above the part in the hernia may have a free discharge.

At this stage you can do no more. Take care that you do not destroy the adhesions which in this condition of the intestine form between it and the peritoneal sac. Apply a poultice or fomentation over the dressing, and, with a comforting draught, put the patient to bed.

[Gooch (see his works) said, that it seemed to him proper, in this condition of the gut, to make an incision into the tumour large enough to evacuate the fæces freely. This I believe to be very good practice, but will an incision into the tumour evacuate the fæces freely? You must put your finger within the gut, and you may then discover that the stricture is so narrow that the evacuation cannot be free. If the point of *the little* finger pass, it is certainly sufficient; but if not, it is necessary to cut the stricture, which to accomplish, without undoing the new attachments of the intestine to the peritoneum, is an operation which requires judgment and delicacy.]

The mortified gut in time sloughs away, and there is a sore in

¹ I have several times seen the gut mortified, and the patient recover without assistance. It occurred two or three times under my colleague, so that we were wont to say he had good luck. But it happens thus: the diverticulum ilii, or the caput coli, forming the hernia, the distress and pain is considerable, but the canal being pervious, the patient bears up until the portion included mortifies, when it sloughs off. The fæces are discharged from the wound for a time, but by-and-by they take the natural passage. The case is very different when a whole turn of the intestine is included.

the groin, discharging fæces ; an anus at the groin. This is a distressing condition, but happily not without remedy.

When we have an opportunity of observing the parts (which I have had three weeks after the intestine has sloughed away,) we find the two portions of the canal adhering together, and adhering at the same time to the peritoneum within the ring. It is apparent, therefore, on what principle the surgeon has to proceed in performing a cure. The procedure of Baron Dupuytren is to be followed.

This is the introduction of a pair of forceps, each blade in a distinct portion of the gut, so that when closed, they may grasp and compress the intervening septum. A communication being thus formed between the portions of the intestine, you are to limit the discharge outwardly by the wound, till the fæces be gradually restored to their natural course.

I have heard of a suspicious number of these cases being under treatment in one hospital, and at the same time. The case presents very rarely.

[In continuation, and on the subject of *anus at the groin*, all the elements for a just reasoning have not been taken. Before we think of sewing the intestine, or doing any finical operation with the needle, we must consider whether or not it is proper to break up the adhesion between the intestine and peritoneum. Such adhesion, I am certain, must have taken place when the intestine is mortified from strangulation. Another consideration is, that the intestine is sometimes ulcerated through, and as it were cut by the stricture. I no where observe the distinction made between ulceration and mortification of the intestine.

In all cases where the gut is open, whether by accident during the operation, (as I have more than once seen,) or by ulceration or mortification, the first object should be, the free evacuation of the portion of the intestinal canal between the stomach and the hernial portion. If the gut has been accidentally opened, we may refer the practice to *wounds of the intestine*. But if the gut has been opened by ulcer or sphacelus, and in hernia, it makes a special case, and should not be confounded with that in which the intestine has been wounded with a sword !

Nature points to the way, and sometimes accomplishes the cure unassisted. When we examine the parts after a portion of intestine has been strangulated and sloughed away, we find the portions of intestine not only adhering to the peritoneum, but closely embraced, and adhering together. It would appear that the spontaneous cure by *anus at the groin* has been effected by ulceration opening a communication between the two portions.

This process we are to facilitate or to imitate. I was wont to say that a gross ligature should be passed between the two portions, the ends of which should be left hanging from their respective orifices. That this would secure, 1. The free discharge ; 2. The attachment of the gut to the wound ; 3. The close attachment of the

portions to each other; 4. The opening of a communication, which nature inclined to and favoured, between the two portions. This mode only yields to that adopted by M. Dupuytren.

If we look forward to this mode of operating, as it requires that the blades of the forceps should be put into the portions of the intestine, now separated by the mortification of the intermediate part, it is obvious that we should be able to distinguish the openings. If this object be not anticipated, and the anus at the groin be formed in a natural way, you will find that there will be only one irregular and tortuous opening from which the *sæces* are discharged: the opportunity of distinguishing the separate portions of the gut is lost.

The reason why, in some rare instances, the patients have done well, in the case of mortified intestine, when left to nature, is this: In the first place, the case in which the gut runs to gangrene is principally where a portion low in the course of the canal is strangulated; for the portion of the intestine is less vital the lower it is in the canal. Again, it is the distention of the strangulated portion which causes the obstruction; and when the portion mortifies and opens, or is opened, the intestinal fluids are discharged—the sudden angle, and consequent tension, of the gut is removed. But still, from experience, I say that the little finger should be introduced *within* the gut, to see that the passage is sufficiently open; since freedom of discharge gives the only hope of the patient's surviving. If the finger does not pass, the stricture should be divided as I have described. But let not my reader imagine for a moment, that I am the advocate for freeing the gut from the neck of the sac. To undo the adhesion, and to draw out the gut, and to cut off the mortified portion, and to fix the ends with ligatures, is the act of one altogether misled, and negligent of the actual condition of the intestine in hernia, of the causes of death, or the hope of success.]

Of the Omentum in Hernia.

Let us take this opportunity to consider what is to be done with the omentum; and, in the first place, I do not like Mr. Travers' saying, that whether (in the case of *epiplo-enterocele*) the gut or the omentum be reduced first is of no consequence; for a good deal of fingering is required to reduce the omentum. It has no muscular action to assist you, and the intestine, long held in a stricture, is in no condition to sustain without injury the stuffing up of the omentum. Therefore, let the intestine be first reduced.

You have understood the condition of the omentum in a hernia—that it is no longer like the omentum as you see it in the dead body, or as you may see it protruded from a wound of the abdomen. Instead of being soft and delicate, it is for the most part condensed where it passes the neck of the sac, and forming a mass in the sac, being heaped together, and adhering.

In the operation of the *taxis*, it is this change which the omentum undergoes in the sac, which causes the difficulty in the reduc-

tion. The reduction must be made gently. M. Arnaud says truly, that, from the reduction of the omentum, the patient suffers a peculiar pain, not consequent on the state of the intestinal canal, but directly from the stomach sympathising with the injury to the omentum. The patient has at first a *mal-aise*—then pain—the pulse becomes weak—the face pale—a cold sweat succeeds, and he may faint; for which, you may order him a cordial, wine with spices.

In the operation with the knife, suppose that the intestine is reduced—what is to be done with the mass of omentum? It cannot be pressed up into the abdomen, and certainly not without being first disentangled and laid out, which, if it be practicable, is attended with a tearing of the substance, and so it is a bloody mass; and it is further injured by being fingered and pressed through the ring.

I have cut it off, leaving the cut surface to bleed, taking care that the stricture be relieved.

But I am of opinion, that when the omentum is attached to the peritoneum of the neck of the sac, the adhesion should not be undone. When the adhesion is undone, and the mass reduced, peritoneal inflammation is apt to follow; and then you find, on dissection, the part of the omentum which was in the sac an inflamed or a putrid mass lying coiled in the abdomen.

The unhappy circumstance, against which it is not in our power to guard, is the dragging of the omentum upon the stomach, from which great distress arises, as sickness and pain on taking food. But if this dragging of the stomach has been a consequence of the descent of the omentum, I much doubt the possibility of relieving it by reducing the mass of omentum; and I am certain that there is not only distress, but imminent danger, from reducing such a mass of omentum as will relieve the stomach when it has been from this cause dragged out of its place.

To cut off the part which has been down, and push up the part that is in the neck of the sac, will be of little advantage; since the omentum adheres to the neck of the sac (and a happy circumstance it is that it does so,) and the drag upon the stomach must therefore be relieved in a very slight degree.

You perceive that my chief anxiety is, that the adhesion of the contents of the abdomen to the peritoneum on the inside of the neck of the sac be not torn up; for then the hazard of fatal peritoneal inflammation is greatly increased.

[There are many occasions in which we have to reflect on the changes to which the omentum is liable. Even when confined within the abdomen, it will form adhesions round the intestinal canal; and at the same time, or rather perhaps consequently, it will become so firm and cord-like as to strangulate. I have in the course of my life made several dissections after *ileus*, in which I have found this to be the cause of death.

When, therefore, we consider the liability of this membrane to

inflammation, adhesion, and condensation, and when we witness its condition in *epiplocele*, we become aware of the danger of strangulation from the coiling of the epiploon round the gut; for example, see the case by M. Bondon—*Sur un étranglement de l'Intestin fait par l'Epiploon.*—*Arnaud*, *Mem. de Chirurgie*, vol. ii., l. c. p. 577.]

Umbilical Hernia.

In the relaxed umbilicus of children some mechanical support is to be given. The section of an ivory ball is employed; the convex surface is placed towards the umbilicus, and the flat surface strapped down. There is a proper truss for the case of more formidable protrusion.

Umbilical hernia is common with women who have had families. Umbilical hernia is to be reduced. The operation with the knife is the exception to the rule; it is very seldom required. If it should be necessary, take the following method. But in the mean time, let me say that, in some late systems, I see an advice given which would bring you into some dilemma. I mean "a crucial incision over the prominence of the tumour." Two young gentlemen, very soon after passing the College of Surgeons of London, had a patient with umbilical hernia, on whom they thought proper to operate. They cut directly over the tumour, laid aside the omentum, and found the intestines in their hands! They cut the stricture, but to reduce the intestine was beyond their power. Now, here lay a woman with the bowels turning out (and they will evolve themselves in a most remarkable manner,) and the handling of the young surgeons was of no avail. The neighbours took the alarm, and all were horror-struck. Now, if you do not wish to encounter this scene, proceed as follows.

Make a small oblique incision on the neck of the tumour, your assistant holding it over to the other side. Having come upon the margin of the abdominal aponeurosis, scratch through the base of the sac: you will find it thick and strong. Having thus got within the sac, hook your finger round, so as to feel the stricture: and feeling it, introduce the probe-pointed curved bistoury (that which cuts only at a small portion near the point,) and divide the margin of the stricture.

After this resume the taxis, and take care if possible to avoid exposing the intestines. The advantage of this mode of operating is, that you can apply the truss; and if it should not be possible to return the mass into the abdomen, at least you have taken off the stricture, and have not exposed the bowels so as to produce fatal inflammations.

[M. Garingeot teaches us that hernia takes place in the tendinous parts of the abdominal walls. See in the first volume of the *Memoirs of the Paris Academy*, p. 690, cases of hernia of the stomach attended with peculiar circumstances. Such herniæ take place in the linea alba, near the xyphoid cartilage. Other ventral herniæ

take place in the *linea semilunaris*. You find there also cases of *herniæ* through the foramen of the obturator ligament.]

Hernia of the Bladder.

You will find cases by *M. Verdier* in the second volume of the *Parisian Memoirs, Recherches sur la Hernie de la Vessie*. The remarkable thing is, that patients have submitted to this complaint without requiring advice, and their condition has only been discovered on dissection. One may say, how is this? what is the peculiarity which distinguishes *hernia* of the bladder from *hernia* of the intestine? The consideration of this point will illustrate the subject of strangulation.

The bladder in a *hernia* does not fill as an intestine does. It does not secrete as an intestine does, and consequently it is not strangulated. If the fundus of the bladder should escape from under the peritoneum, and slip down into a *bubonocoele*, the ureters are not engaged. The urethra is free, and the circumstances which I have pointed out to you as causing incarceration and strangulation are not present.

Herniæ of the bladder, with calculi, are recorded by *Ruysch* and many others.

CHAPTER XXIV.

OF THE STONE—SOUNDING—LITHOTOMY—LITHOTRITY.

Surgical authors seem to delight in leaving their proper subject, in order to occupy neutral ground. I shall not here treat of the chemical structure of *CALCULI*. I have learned very little in consultation with my learned brethren on this subject. How delicate the subject is, can be made to appear by the succession of layers of different chemical composition in a common calculus. How slight the causes are which produce different composition in calculous deposit, we may learn from the changes occurring during hysteria, when red and white sand are produced alternately. How slight the change in the process of digestion, which shall produce an alteration in the composition of the stone, every day's experience evinces; and how apt, therefore, practitioners are to do mischief by chemical correctives introduced into the stomach. Thus saline draughts with excess of alkali may cause the red sand to disappear, and throw down in its stead a more insoluble compound—a triple phosphate.

It is, indeed, a delicate subject, and the last discoveries show that only mischief can have resulted from former interference. Study

to correct the state of digestion, and give tone to the viscera, as the only safe measure of practice when there is deposit from the urine. A course of blue pill, or an active purgative, will make the urine alkaline,—another proof that the safe mode of correcting the secretions from the kidney, is by attention to the digestive process.

§ 1. LITHOTOMY—OPERATIONS FOR THE STONE IN THE BLADDER.

As we turn from one scene to another, we know not which is the most important duty of the surgeon; there are so many occasions on which self must be forgotten, and devotion to the duties of humanity must overcome all lesser considerations. I have felt that there is no reward sufficient to compensate for the anxieties attending the task of the lithotomist. And let not the unfeeling suppose that they are better suited to the duties of the surgeon; we owe the improvement of the operation of lithotomy to those who felt severely the responsibility of their office.

We must not here indulge in that curious history of the progressive improvements in the operation of cutting for the stone; you will read it in the first volume of Mr. John Bell's *Principles of Surgery*, 4to.

If we begin with the account which Celsus has given of the operation, we shall trace it as the operation with the apparatus minor, through the early and middle ages; an operation after the Egyptian method, that is, a handicraft transmitted from father to son, or from master to apprentice; a work done by imitation, and mechanically, and without science or the anatomical knowledge of the parts.

We learn, on the other hand, that, as the operation seems ever to have been attended with risk, the physicians, who then guided the hand of the surgeon, found a reason for those disasters in an aphorism of Hippocrates, that membranous parts should not be cut. This gave rise to the operation with the apparatus major—a cruel proceeding, an operation of dilatation, as it was supposed, but in truth of laceration.

Whilst the surgeons of Paris were in the use of performing this operation, in which the sufferings of the patient were grievously prolonged by the use of many instruments, appeared Frere Jacques, an itinerant operator, one who had, in the manner which I have stated, learned to practise the operation, viz. by imitation. He was a barefoot mendicant friar, doing his office for the love of God, and doing it as if by inspiration, quickly and successfully. His operation was indeed a contrast to the laboured, protracted, and of course painful, operations of the surgeons of the Hôtel Dieu. Here commences the history of lithotomy as it touches our manner of operating in the present day. You must study this piece of history: the anxiety of the surgeon Fagon, who was suffering with the stone; the fate of the Mareschal de Lorges; the improvement of Frere

Jacques under the instructions of the Professor Du Verney ; and the established reputation of the lateral operation.

The symptoms of stone in the bladder are :

[1. Frequent call to make water. 2. Pain after making water. 3. Pain in the lower part of the glans penis. 4. Bloody urine, especially after exercise. 5. Pain in going down stairs. 6. Mucous sediment in the water. 7. Great suffering, with a countenance that betrays no disease. We need go no further, since these signs are enough to induce us to sound and search the bladder.]

Of Sounding for the Stone.

You may introduce the sound whilst the patient stands before you, leaning on your assistant, or against the wall. In this position, to find the stone, you must carry the point sharp round the os pubis, for it will be found lying on the os pubis.

You then lay the patient down on the sofa, and then you will feel the stone with the convex part of the instrument. Not feeling it, you will press the sound down, and then you will chuck it if it lie, as probably it does, behind the prostate gland.

If you do not touch the stone, do no violence feeling in different quarters ; but *change the position of the patient*. Prop up the hip with pillows ; raise him higher still by the thighs ; and the stone will gravitate from the sort of cell in which it probably lodges towards the fundus of the bladder, and meet the sound. Roll him first to one side and then to another.

When your patient has been sounded and no stone felt, and when you are notwithstanding, from symptoms, pretty sure that there is a stone, study then the position ; as it were, shake the calculus from its place of lodgement ; raise the lower part of the body ; and probably at once, without giving the patient further pain or trouble, you touch the stone, and he is sensible that you do so.

When you feel the stone, the next important inquiry regards its bulk. You are not satisfied, with a view to lithotomy, without pressing the sound first on one side of the stone, and then on another. You endeavour to dodge the instrument over the stone, to ascertain the extent of surface. You may introduce the finger into the rectum, and feel the stone between the finger and the sound. Some surgeons will not operate until they have thus examined.

You may be deceived in many ways ; the rub of a stone in the urethra or prostate may, if you are not careful, give you the impression of a stone in the bladder ; and when you think you are moving the instrument from point to point of a large stone, you may be only striking the same small stone repeatedly.

Therefore be careful, as you pass the instrument, to calculate the parts it perforates ; so that you shall know when it enters the blad-

der, and consequently that all *rubs* before that must indicate only calculi in the urethra or in the prostate.

Be careful to distinguish the callous or ulcerated surface of a diseased bladder from stone; which is often the more difficult, as calculous matter concretes whenever the natural mucous surface of the bladder is abraded.

It will seldom be necessary to sound with the silver catheter. However, you may be induced to try this method. It consists simply in introducing the catheter, and letting off the urine at the same time that you move about the catheter; thus exploring whilst the bladder is in the act of gradually contracting.

The Operation of Lithotomy.

[See that you have every thing you can by possibility want, and that your assistant knows what you shall stretch out your hand for, and the stages of your procedure. You want little it is to be hoped. *The staff, the knife, the blunt gorget, and the forceps, perhaps a scoop or lever, are to be at your hand, or in your belt.* But it is presumptuous to suppose that all is to go right. Some circumstance may derange your plan. On the bye table, therefore, have various forceps and scoops—a proper syringe—a prepared tube—and strong forceps to break the stone; with needles and tenaculum and ligatures. These need not be in sight. Lay a folded blanket on the table; waxcloth below the table; water and sponge; wine and water in the room.

There is one thing I would insist upon,—a large staff with a large groove. There was a great mistake in using the staff of the apparatus for cutting with the gorget. The staff was small, and the groove suited to the beak of the gorget a mere slit. When I became surgeon of the Middlesex Hospital, I not only found no staff there, but not in any instrument-maker's shop did I find a staff suitable. My staff was always as large as the urethra of the patient would admit, and with a large groove. When you use a small narrow staff, you cannot at once cut into the groove and lay open the urethra; the soft parts turn round on the instrument, and you must cut again and again. Besides it gives you little assistance in passing either your finger or the forceps into the bladder.]

The assistant is expected to do all the preliminary operations. See that the table be stout to bear both patient and assistant. The garters are round the wrist; the staff is introduced; the stone is felt; the patient is then tied up.

[The surgeon may well dispense with the ceremony of letting the consultants feel the stone, by the way of making them parties to the event! He should himself feel it; lay the sound in contact with it; determine in his own mind whether it lies above or below, or to one side of the staff. "He who sounds well, cuts well:" with him there is no groping with the forceps, as if he were seeking something in an empty pocket.]

The incision.—The first incision is made by entering the knife between the bulb of the urethra and the ramus of the os pubis, on the left side of the perineum, and carrying it down past the anus.

[In doing this, you do not cut with the face of the knife; for an incision thus made is sufficient to the eye, but the parts which ought to be divided are not cut. Therefore, strike the scalpel dagger-ways into the space by the side of the bulb; and as you carry it down you must bring it more superficial, or the rectum is in danger: and then it cannot be an incision, but a dissection; for, having made this first cut, you put the fore-finger of your left hand into the wound, and pressing down the parts, and pressing back the rectum, you touch the fibres again and again; cutting across the transversalis perinei.]

Of late years I have cut differently, and with much advantage. My knife is sharp-pointed, cutting on one edge only; or a common scalpel, with a piece of adhesive plaster around it, leaving an inch and a quarter of the edge uncovered.

I introduce the finger of the left hand into the rectum. I plunge in the knife with the edge upwards, a little behind and by the left side of the anus. The deep sphincter is between the knife and the finger. I carry the point of the knife quite up to the face of the prostate. I move it there so as to cut the essential parts, in order to lay bare the membranous part of the urethra; and withdrawing it, I cut across the transversalis, and carry the edge at once up by the side of the bulb: the *incision* is completed. If this be done slowly and deliberately, it looks well; but more than that, all essential things are accomplished. There is a large and deep incision, low enough by the side of the anus, and the more delicate part of the operation is done, whilst yet the patient hardly feels the pain, for this piercing of the point of the scalpel is by no means so painful as the broad cut; and the finer part of the operation is at once finished, whilst the patient is perfectly steady.

Moreover, I am convinced that this was the cut of Frere Jacques, who is described as using his knife dagger-ways, plunging it in at the point of the hip! To those who were cutting on the staff, where it was made to project in the face of the perineum, this deep incision must have appeared too bold. But when you consider the depth of the parts, and that they must be cut to insure the patient's safety, you will probably adopt my method.

I cannot sufficiently impress upon you that the first incision is not merely to make way into the bladder, but to give an easy and depending discharge to urine and matter, so that there shall be a free opening afterwards.

The most common error is in making the incision too high,—feeling for the staff. I have seen full one half of the incisions above the level of the arch of bone, and consequently useless. The effect of this is, that when the operator has grasped the stone in the forceps, it is driven out of his hold by coming against the arch of the

pubis; and he cannot, as he ought, draw downwards, because the incision is not low enough.

As to cutting on the staff, never mind the staff in this part of the operation, but cut for the face of the prostate gland; the point where the urethra runs back into the gland.

Second Incision. Cutting into the Neck of the Bladder.

You now turn the edge of the scalpel upwards, and towards the groove of the staff.

You enter the point into the membranous part of the urethra, just anterior to the prostate, and cut towards you until you feel the knife grate in the groove of the instrument.

[Observe that when we say the membranous part of the urethra, you find nothing of the kind now, for the substance around the urethra is firm, and you have some depth to cut into the staff.]

The groove of the staff should be rough, not polished, so that you may feel the knife grating in it.]

Having got the knife in the groove of the staff, turn the point towards the prostate, the cutting edge towards the left side of the patient, and carry it directly into the bladder; and resting the point in the groove, you move the handle of the knife so as to open the side of the prostate gland. The point of the fore-finger of the left hand may now (directed by the groove of the staff) be passed through the prostate. You may proceed with the operation, with the scalpel. But I rather advise you to lay aside the scalpel, and taking the bistoury, pass it along the groove of the staff into the bladder, and at the same time direct it by the finger. The bistoury directed to the left side of the prostate completes the division of that lateral portion.

Our best operators say, and I believe them, that much must be done with the finger; for the finger being in the bladder, in a man of moderate size, you can feel the stone, although, perhaps, you yet cannot judge of its size. You pass and repass the finger. You feel the edge of the incision. You again, perhaps, lay the flat side of the bistoury on the finger, and turning up the edge, you cut the resisting part, and always in the direction to the left side of the neck of the bladder.

The Introduction and use of the Forceps.

So far all is easy and plain, and an anatomist can make no mistake. If you use such a staff as I have recommended, you place the blades of the forceps into the groove of the staff, and run them into the bladder. If you have the slightest doubt, or feel the possibility, of the forceps not passing into the bladder, you use the blunt gorget, slip it along the finger, and the forceps along the gutter of the gorget.

[I have never found this necessary, but in your early operations, you must take every precaution.]

When you have the forceps in the bladder, you make the assistant withdraw the staff; you feel the stone with the closed forceps; you expand them laterally. If the stone has been above the staff, it now falls into your grasp. If below, the contracted bladder will raise it into your grasp; not seizing it, you rise from your seat, and carry the forceps down behind the prostate.

When you have grasped the stone, you cannot expect to *pull* it out directly; you have to dilate and to bring the stone, which probably projects beyond the blades of the forceps, over the edge of the incision in the bladder. Therefore, take time; it is becoming, and it is right. Use the blades of the forceps as the accoucheur does, in delivering the child's head with his forceps, (I have seen an operator move them up and down!) move the handle first to one side then to the other, and carry the whole low and towards the rectum, else you will bring the stone upon the arch of the os pubis, and it will be thrown out of the grasp of the forceps.

The stone being extracted, you look to it; if it be rough on all its surface, there is no other stone; if flat and smooth on one side, there is another stone. At all events, you explore the bladder to be satisfied, and a catheter or sound may be used.

[If the stone has broken, if chips are apparently broken off, the bladder must be injected. The pipe for injecting the bladder should be open on the side. I have observed the direct and forcible injection of fluid into the bladder to give pain.]

When I have attended the most distinguished operators of London, they have put a tape around the thighs of the patient, and put him to bed. This is a practice I on principle disapprove.

[I have only one thing to add to the usual precautions in the after treatment: As the urine does not, and ought not, to pass the urethra for a fortnight, the urethra is irritated with its own secretions, and tepid water should be carefully injected from the penis backwards into the wound. It gives very considerable relief.]

Let us consider why this operation is looked upon as so serious, and inquire how and from what cause the patients die.

The first and especial cause of death is violence; violence in extracting the stone, and that either owing to its great size or to a bad incision.

The next is extravasation of urine.

The third and last is hemorrhage. A *large stone* is indeed a serious matter. If you compare the width of the broadest of the cutting gorgets with the circumference of a large stone, you perceive at once that, in the operation with the gorget there must be grievous laceration. So far, at least, the advantage is with the scalpel and the bistoury, that you can enlarge the incision when you find, from the grasp of the forceps, that its diameter is great. But first endeavour to discover whether or not you have seized the stone in its largest diameter; for it is a sad thing to be bringing forth

a stone grasped by the forceps in its longest diameter, when you might have extracted it with much less effort, not to say violence. It is sometimes possible, without losing hold of the stone, to turn it with your finger. If this be not practicable, you must let it go into the cavity again, and seize it anew.

If you hold the stone with its long diameter in the length of the blades of the forceps, and still it is large for the incision, I would not advise that it be let go. Rather wrap a turn of a wet roller round the handles, so that the instrument retains its grasp, and with the finger and the probe-pointed directory enlarge the incision; and if it be required, you may direct the edge towards the right side, and divide the right half of the prostate.

If the stone should break, let it not trouble you; it is better to use the forceps often than to drag out a stone with violence. For any lesser reason, I should be sorry you were to introduce the forceps often.

I dislike on all occasions to speculate on what might be done. I believe in these volumes I have noticed nothing which I have not either practised or seen put in execution; but I think it practicable in the event of a very large stone, to break it by the means used in lithotrity.

Of the Extravasation of Urine.

I had operated on a gentleman to my own contentment; every thing promised well. I left him in charge. I received a letter which alarmed me. In the evening of the operation, he had intense desire to make water. He felt that he did make water, but little came. This gentleman died in the third week of suppuration in the pelvis. The evil had been done in the night of the operation. The urine had been forced into the cellular membrane, laid open by the incision, whilst it was stopped in flowing outwardly by the agglutination of the lips of the wound. In all future operations, I used a tube for two days.

On this unhappy occurrence, I consulted books and cases, and I perceived that many unfortunate cases of lithotomy were attributable to this cause.

On these considerations I would not have you bring the patient's thighs together. I would not have you felicitate yourself on your patient making urine, by the natural way, immediately after the operation, or on the second day. On the contrary, lay a bit of oiled lint between the lips of the wound, and return early and pass your finger into the wound, and break down the coagulum, so that the urine may pass out freely.

This you must do, if you do not take my advice, (which some would rather burn their fingers than do,) which is to have a portion of elastic gum catheter, covered with dressing and oil, to be laid in the wound. It saves a great deal of anxiety; it is not thrust deep;

the patient is not sensible that it is there; it does no harm; it saves many lives.

With regard to hemorrhage.—By the common operation—too common—of cutting into the bulb of the urethra, and slitting the urethra up to the bladder, the artery of the bulb is cut, and the bleeding is considerable. The transverse artery of the perineum must be cut, and the bleeding from it is no more than what is proper. But when the internal pudic artery comes down upon the side of the prostate, and there is cut, the patient may die of hemorrhage.

In a protracted operation, the operator is not sensible how much blood is lost, till looking under the table he sees a very large cake or mass of coagulum. In this case, the operator would do well to look to the vessels before putting his patient to bed. They may have ceased bleeding for the time, and yet on the return of bleeding the patient may die!

I cannot conceive the difficulty in taking up a deep artery. It is always possible to hook up the part, and throw a noose over the tenaculum, and let the tenaculum remain for the night.

But I have known bleeding from the interior of the bladder, and that I could not stop.

The cutting gorget was the most unhappy invention, and has cost many lives.

The operation with the *bistoure caché* is, if possible, worse.

Many improvements of knives and bistoures have been made. They too often declare past misfortunes, and the weak inventions for their avoidance. They are, however, harmless as long as the surgeon depends on his knowledge of anatomy, and does not trust to mechanical contrivances: as long as he feels his way and uses his finger more than his knife.

I may be permitted to add, in recommendation of the method and the precautions which I have offered for cutting for the stone, that the last patient on whom I operated—the last on whom I shall operate—I met at the beginning of the third week in Regent street! The urine had passed naturally on the beginning of the second week, although there had been a tube in the wound for two days after the operation.

There is only one subject more that occurs to me as requiring your particular observance. Every authority, every surgeon of repute, has declared the great impropriety, the ignorance and stupidity, of trying a man's dexterity by the time taken in this operation. Try him, if you will, by his collected manner—by his methodical proceeding—by his making no second effort to accomplish any part of the operation. Admire him, because he has anticipated every thing, left nothing to chance, and is never for an instant without his resources; but know, that if you take your stop-watch, you are disgraced in the mind of the well educated part of the profession.

[Mr. Carpue introduced to the *English reader*, Souberbielle's high

operation for the stone, and Mr. Martineau did him the honour of commenting upon it.—Med. Chir. Trans. vol. xi. p. 402.

Mr. Martineau, in his early practice, “witnessed many untoward circumstances,” which determined him to lay aside the cutting gorget, and use the knife only and the blunt gorget. You ought to have beside you a conductor or blunt gorget, but I hope you will not find it necessary. When the staff is large enough in the groove, and when you use the fore-finger of the left hand properly, you will need no other directory than the groove of the staff.

Mr. M. takes the staff in the left hand, and the blunt gorget in the right. This to me would be an awkward part of the operation. It is better to do the operation by introducing the finger along the staff, and then enlarging the wound by passing the bistoury on the finger; and withdrawing the finger two or three times, you ascertain that the passage is large enough, smooth, and uninterrupted by irregularities.

Mr. M.’s operation is excellent. But I object to the dressing with lint and tow *to exclude the air*, because it cannot be done without encountering a greater enemy, the confinement of the urine.

Mr. M. aims at healing the wound by the first intention. These are seducing words, but the thing is not to be thought of; *first*, because it is not possible,—and, *secondly*, because there is danger of obstructing the flow of urine, and driving it among the cellular membrane.

Mr. M. is aware of coagulum of blood obstructing the urine; and he adds, if it be suspected, it should be relieved by passing the finger into the bladder.

But what is it that gives the suspicion? Is it not the ineffectual strain to make urine? Now, it is at this time that the mischief is done; and, therefore, to avoid it, we must use the tube, or pass the finger soon after the operation, and again and again.

I quote Mr. M.’s concluding remark. “Death follows oftener from exhaustion after a tedious operation, or from despondency, in which the powers gradually decline, than from acute disease.”

As for despondency, the state of a man freed from the pain of stone is a state of exquisite delight and pleasant anticipation. The “despondency” I believe to be the effect of loss of blood; and the “exhaustion,” I take to be the shock to the system from the violence done.

For cases of lithotomy unfortunate in consequence of the great size of the stone, read Mr. Earle’s paper, Med. Chir. Trans. vol. xi. p. 76.

The instruments which I have seen for breaking the stone are made powerful enough, but then they are made to grasp a stone of moderate size, and no more!

My notion of dealing with a large calculus, is to grasp it with the common forceps, and to excavate it and crush it. The instruments for lithotrixy afford the model.]

Note on the High Operation for the Stone.

When in conversation with Mr. Cline, I informed him that they were reviving the high operation in St. George's. He said he was present at the last operation of the kind performed in England, and that the intestine fell out from the wound!

What was it, then, that made them dismiss this operation here in England, and in our own time revive it in France? The objection to the high operation was—1. The neighbourhood of the peritoneum, and the danger of peritoneal inflammation. 2. The contraction of the bladder, and the frequent impossibility of raising the bladder so high as to expose it without cutting the peritoneum. 3. The evacuation of urine from the incision into the cellular membrane behind the pubis, and the difficulty of emptying the depot of urine and matter when this did occur. 4. The hazard of chipping the stone in operating with the forceps, which portions of stone it was difficult to get out of the bladder, and when they remained they formed the nucleus of another stone.

The revival of the operation was on the alleged necessity arising from the difficulty of extracting large stones from below. But, surely, if the operation be performed below, and by incision, in the neck of the bladder, and if, instead of introducing forceps of monstrous size and grasp, the stone be broken up by the operation of perforating it and bursting it up, the patient will suffer a less hazardous operation than that of the high operation.

I must, however, notice the manner in which it is proposed to obviate the objections to the high operation. The incision is made first in the perineum, in the usual manner; then a staff is introduced from below, and the fundus of the bladder pushed up above the pubis. Here it is cut upon, and the stone extracted, so that the bladder is transfixed, and two incisions made into it instead of one. The lower incision obviates the objection to the chips of the stone remaining in the deep cavity of the bladder, and also the escape of urine upwards upon the cellular membrane of the abdomen. This double operation I cannot approve of.

Of the Stone in Women.

The direct and short urethra, and the absence of the prostate gland in women, make it the duty of the surgeon to proceed in a different method from the above when there is stone in the bladder. The complaint is rare. When stone forms, it is often expelled without assistance; and it is possible to render assistance without cutting.

The female urethra admits of dilatation. You accomplish it by a succession of bougies, or you use a piece of gut introduced into the urethra, and forcibly distended with air. The width of passage thus obtained admits at once of the use of the forceps, so that the

calculus may be withdrawn; and if this be not at once practicable, an instrument to break the stone may be introduced, and afterwards the fragments can be brought away.¹

Of the recto-vesical method of cutting for the stone—I ought not to speak at all, having neither practised it nor seen it performed. Indeed, as to seeing these operations, little is to be learned. As far as my judgment goes, the recto-vesical operation offers no advantage which we do not obtain by the lateral operation, when the external incision is properly made. On the other hand, there are very obvious disadvantages, *e. g.* the deep section of the rectum, the division of the vesiculæ seminales. If it were desirable to cut into the lower part of the bladder behind the prostate gland, nothing would be easier without implicating the rectum, if it promised to obviate any difficulty encountered in the lateral method. I entreat you to read diligently the history of the operation of lithotomy, before you think of deviating from the prescribed incisions which long experience has proved to be the best.

Additional Note on Lithotomy.

I have repeatedly stated that Cheselden performed his operation in three different modes. 1. That he cut into the bladder without dividing the prostate, a method that proved most unfortunate. 2. That he performed the operation by inserting the point of his knife into the membranous part ("muscular part"), anterior to the prostate, and carried the incision through the left side of the prostate into the bladder. 3. That he varied his method a third time, cutting the same parts in a contrary direction.

On this subject you will read with interest a paper by Dr. Yellowly. He makes it appear that Douglas was incorrect, in asserting that Cheselden changed his mode a third time. For my own part, I always objected to follow this great surgeon in his third method, and have ever recommended the second mode, and practised it. I must add, however, that there is no difficulty in pushing the knife behind the prostate, and cutting the neck of the bladder, by drawing the knife towards you along the groove of the staff. My difficulty is to conceive a motive for Dr. Douglas describing this so-called third mode of operating, unless he had been so informed.

¹Mr. Bloomfield introduced a piece of gut, the cæcum of some animal, into the urethra of a girl, and by distending the gut, dilated the urethra in such a manner as to permit a calculus to be discharged. Douglas employed sponge for the same purpose, and recommended dried gentian root. There are two papers by Mr. Thomas of very considerable interest. In the first (*Med. Chir. Trans.* vol. i. p. 123,) he proves how easy it is to dilate the neck of the female bladder. This he did to introduce his finger and extract an ivory ear-picker. Dr. Yellowly, in the 5th vol. *Med. Chir. Trans.*, gives an account of a stone removed by the fingers from the female bladder, weighing $3\frac{1}{2}$ ounces 3 drams, $3\frac{1}{4}$ inches long, 2 broad.

It seems all very easy, and yet I have seen a poor woman die, resisting all attempts to give relief, from the extreme sensibility of the parts.

I trust that now, by what you have seen and heard, you will be able to appreciate the curious history of this operation by Mr. John Bell. See his works, the 4to edition.

§ II.—LITHOTRITY—BRUISING THE STONE IN THE BLADDER.

The cutting down the stone in the bladder—the bruising of the stone—had been laid aside as an operation, and forgotten.

The operation of cutting into the bladder by the perineum, and so reaching the stone, and breaking it down, is a very ancient operation, and one which I have hinted in the foregoing pages may be resorted to when the stone is large. The contrivances of modern date for breaking the stone in the bladder give still more countenance to it. The discovery, as it is called, of the possibility of passing a straight instrument into the bladder, has given rise to the operation of lithotrity, of filing down, boring, and breaking the stone, without cutting, by instruments similar to those which in former times were used for stones in the urethra. The proposal of operating without cutting is ever a favorite and popular one, and so this has been received to be carried, as the history of our profession uniformly shows, in similar instances, *too far*.

The first instrument that attracted the attention of the profession was of the nature of the *tire-balle*. From a straight canula three elastic branches were pushed forth; with these the stone was seized, and held, whilst a perforator or gimlet played in the centre, excavating the stone, and so weakening it, that on the branches being drawn within the canula, the stone was crushed between them. This I believe was the invention and practice of M. Civiale.

A great many additions, improvements, and not a few stupid inventions, have been joined to this original instrument.

But although these instruments were supposed to owe their simplicity and excellence to the possibility of introducing a straight instrument into the bladder, it soon appeared that one of a curve so abrupt towards the end as almost to form an angle, was better suited to the purpose of breaking the stone.

This instrument consists of two parts or branches of equal length and strength, joined by a sliding groove. When the inner one is drawn up, the extremities, being abruptly bent, necessarily separate, and are so contrived that they may be made to grasp the stone. These ends are notched into strong teeth, and are capable of breaking and crushing a calculus.

To this instrument the Baron Heurteloup joined two contrivances of very doubtful utility. The one, a chair, to which the apparatus, the extremity of which was in the bladder, is firmly screwed!—a very alarming piece of machinery, and certainly to be resigned. The other was more ingenious: a heavy vice is firmly screwed to the lower or further division of the instrument, whilst the other is struck with a hammer; the blow of the hammer strikes down the one part of the instrument upon the other, and the

stone being between, is broken. The vice attached to the lower portion receives the impetus, and saves the bladder.

This instrument received its last improvement from a London workman, by the substitution of a screw and lever for the hammer.

Let us now consider the effect of these instruments, and the degree of safety with which they may be used.

Whoever knows the constitutional peculiarities of patients under the use of the bougie for stricture; whoever has had experience of the effects of using too large an instrument, and forcing it into the bladder, will ask himself whether these very rude operations can be done with safety? Sitting in a committee of medical men in London, tell me, said I to my neighbour on the right hand, have any of your friends died under this operation? "Yes, I am sorry to say, two." And turning to my friend on the left, have your patients suffered? "I have lost three." Then, why should not the world know it? Why let society suppose that here is a new, a bloodless, and a safe operation, when more men have died in a given time from lithotrity than lithotomy?

Great praise is due to the men who have ingeniously contrived these instruments; but we must not go with the million irrationally. The most grievous accidents result from these operations. The sharp fragments of the stone stick in the prostate and neck of the bladder. They obstruct the urethra, and give great pain, and endanger total obstruction. When the stone is destroyed by successive operations, the neck and interior surface of the bladder are permanently hurt. If too much be done at once, or the instrument be opened too largely and abruptly, inflammation, fever, and coma result.

The instruments fail—a blade has broken in the bladder—the blades have been bent back, so that the instrument could not be extracted without cutting into the perineum, and closing the strong forceps—a stone gets entangled between the blades near their angle, and cannot be disentangled, and the instrument cannot be got out unless the bladder be cut into, and the stone picked away.

These are facts which ought not to be concealed, and for exposing which I have been blamed; but not, I hope, by sensible and considerate men. I have, as officiating in a public hospital, considered myself under the necessity of crushing the stone, and all has gone on well and safely.¹

Giving my most serious attention to the question, I must say these are great improvements—great additional means of affording relief are put into the hands of the surgeon—that one great advantage has been derived from the repute of these operations, men suffering from stone do not conceal their condition, but come early to consult their surgeon, having learned that there are other means of obtaining ease than by cutting. The operation is to be prac-

¹ The instrument, which I selected from many, I afterwards found to be that used by Mr. Ferguson.

tised where there are small stones. These may be crushed, and washed away with safety. But the difficulty of dealing with large stones is the same as formerly; they should not be attempted to be crushed with these instruments, but the operation of lithotomy preferred.

[My remarks on this subject, when the cases were still before me, you may see in my Clinical Lectures.]

The Extraction of Small Stones from the Urethra.

Have no hesitation in cutting upon these when they are forward in the perineum; if sticking just within the mouth of the urethra, the lip may be slit open to relieve them. If the stone be near the neck of the bladder, there is an excellent and simple instrument invented by Sir Astley Cooper. The method of using it is this: 1. Sound and ascertain the exact place of the stone with the urethra probe, and measure off the distance on the forceps. 2. Introduce the forceps down to the stone. 3. Push down the wire with your thumb, and by the opening of the blades expand the urethra just anterior to the stone. 4. Make the patient strain and forcibly make urine; the stone will be sent forwards within the grasp of the instrument, when you withdraw it slowly and cautiously, lest you lose your grasp, or cut the membrane of the urethra with the stone.

CHAPTER XXV.

ANEURISM.

Of the Operations for Aneurism.

[Read Dr. Hunter's paper, Medical Observer and Inquirer, vol. i. p. 323, and the succeeding volumes on Aneurism of the Aorta.]

Aneurism in its worst shape is a terrific disease. Aneurism of the aorta, for example, when occupying the chest, and pressing on its contents; the tumour pulsating with a blow like that of an engine; then rising visibly, gradually increasing, and suddenly bursting with a force that sends the blood to the ceiling!

Again, in the extremities the tumour is with equal certainty fatal, if left without timely aid, and thereby imposes on the surgeon an extraordinary responsibility. You must therefore desire to know its nature, and what can be done to avoid such an impending calamity as death by hemorrhage.

An aneurism is a tumour of arterial blood.

[I do not say a *pulsating* tumour of arterial blood, although it is

generally so denominated, because by imagining that an aneurism must pulsate, great errors have been committed.

Arnaud saw the aneurism of the thigh opened for an abscess, *par un tres grand praticien*. See also Palfin, and Paré.

Again, there are tumours which pulsate and are not aneurisms. There are pulsations in the abdomen, which in conjunction with the most experienced surgeons, I have taken for aneurisms when there proved to be none.

The position of a tumour in relation to an artery will give it a pulsation; and an artery, *e. g.* the carotid, turning over the lobes of an enlarged gland, will produce a very deceptive pulsation.]

The distinctions of aneurismal tumours are these: We have true and false aneurism, making the real and important distinction. The first is from disease, the latter from accident.

[The term diffused and circumscribed may be given to either, since a diseased artery may burst out so suddenly as to drive the blood abroad in the cellular membrane; or may give way so slowly as to permit the cellular membrane to be condensed so as to circumscribe the tumour.

So may it happen in the case of a wounded artery, *e. g.* when the lancet in bleeding in the arm touches the brachial artery, the wound being small, and the integument carefully pressed down, the blood is confined, and in the end a circumscribed tumour is formed; whereas, if the artery be more largely wounded, the blood is diffused.]

Having got rid of these terms, indicative of the *conditions* of an aneurismal tumour, we attend to true aneurism, our proper subject.

True aneurism,—that which arises from previous disease of the coats,—is marked, 1st. By the abruptness of the tumour; 2. By the presence of coagulum or clot within it; and these are necessary accompaniments of each other.

The state of the artery common in old age, when premature, is that condition of the coats which gives rise to aneurism. From thirty-five to fifty is the age most subject to aneurism, when the vigour of exertion is undiminished, and the artery prematurely weakened. Aneurism is not the disease of old age.

The coats of the artery are thickened, and unusually brittle; they easily separate into layers; yellow spots of concretion (improperly called ossification) form between the inner and muscular coats. The fine elasticity of the vessel so perfectly adapted to sustain the heart's impulse, is lost, and the artery dilates.

[I have elsewhere said, that the ligature of an artery is a subject of the first interest,—not on account of tying the artery of a stump, or an artery accidentally opened, but because of the diseased state of the coats when you are under the necessity of tying it for aneurism. I have seen the artery give way under the ligature during the operation. I have seen the iliac artery burst among the operator's fingers; and I have seen the artery give way from the

pressure of the tourniquet, applied on the occurrence of secondary hemorrhage.]

The general dilatation of an artery is not an aneurism, although, looking to its consequence, we may call it *aneurismal*. The inner coat, which is that which sustains the artery, chips and breaks; then an abrupt tumour forms, then also the coagulum forms, and it is a true aneurism.

[When we dissect an aneurism on the outside, it appears to be continuous with the natural coats of the artery. But on laying it open, you perceive the abrupt termination of the inner coat.

Joined to this you find the clot; for, as we have explained (in the pages on the spontaneous stopping of hemorrhage) the inner coat alone has the property of preserving the blood fluid, and no sooner is the inner coat chipped, than coagulum forms. This coagulum is deposited layer within layer; and it is dense, and as it were, impacted by the force of internal pulsation; so that if it does not prevent the giving way of the coats altogether, it delays it.]

Aneurism forms most frequently where the pulsation of the heart is most forcible; necessarily in the turns and angles of the tube, and therefore, most frequently of all, in the arch of the aorta.

Surgery can do little in these cases of internal aneurism. You put the patient on restricted diet; you take blood from the arm in small quantities, and frequently. When the tumour becomes external, and the patient desires the prolongation of life in these sad circumstances, a sort of artificial sac of plaster may be made to cover the tumour about to crack or burst.

[More commonly the death, in these internal aneurisms, is by the general weakness, or by pressure on neighbouring parts, or the tumour bursts into the lungs or trachea, or œsophagus; often it presses on the latter tube, so as irrecoverably to obstruct deglutition.]

The stages and natural consequences of External Aneurism.

When aneurism forms in the great arteries leading out of the trunk, we may observe the consequences, and these consequences become here subjects of deeper interest, as we must interfere, by operation, to prevent the catastrophe which is otherwise too sure to follow.

1. At first we find a small tumour which pulsates powerfully. It is compressible, and can be emptied.
2. It becomes larger and harder, cannot be compressed, and is attended with pain. The pulsation is still distinct.
3. It enlarges, but not uniformly; a new swelling, pulsating distinctly, forms; the older portion of the tumour beats less distinctly.
4. The tumour enlarging, inflames; there are small black spots on the integument; it sloughs, bursts, and there is an alarming hemorrhage.
5. The means of arresting

the hemorrhage are temporary and ineffectual; there are repeated hemorrhages, and the patient dies.

All this misery is consistent with general health. Is nature, then, altogether passive? Is there no natural process of cure?

Natural Cure. Method of Valsalva.

The spontaneous cure of aneurism is a thing so rare,—so little to be depended on,—that it does not enter into the computation of the surgeon. Still thus it sometimes happens.¹

[When the tumour has assumed a great size and alarming aspect, when it is to be expected that either more extensive diffusion or actual rupture must take place,—it stops pulsating; the limb becomes cold and benumbed; the constitution sympathizes with some great change; the patient is faint, and shivering, and sick. After a period of great alarm, the limb becomes warm; its sensibility returns, but happily not the pulsation. On the contrary, the tumour is hard, begins to diminish, and there is a natural or spontaneous cure!]

The rationale is this: The artery having originally given way on one side, as the tumour enlarges, and as additional layers of coagulum are added, the trunk of the artery is more and more pressed and displaced; so that at length the stream of blood, instead of being directed from the upper into the lower portion of artery, runs into the sac, where, coagulating, it presses against the lip of the communication between the artery and the sac, which from that time acting like a valve, stops the flow of blood altogether. The collateral vessels then take upon them the office of supplying this lower part of the limb, and there is a final derivation of blood from the aneurismal tumour.]

A very anxious question is to be solved: Are there means which may eventually lead to this spontaneous cure? Can we imitate it? And this leads to the *method of Valsalva*. Valsalva, be it remembered, was the master of Morgagni, a responsible name. The method is this:

[In circumstances where it is impossible to operate, the practice is, to reduce the patient's strength, and the force of circulation, so as to induce the formation of coagulum and the shutting up of the main vessel.

He is to be bled again and again,—he is to be fed, or rather starved, on a little weak soup,—he is to be reduced to that condition of weakness, that he cannot raise his arm over his head. In addition to this, the limb is to be covered, and benumbed with cold spi-

¹ Aneurism spontaneously cured, see—Guattani de Aneurismaibus.—Ford on Popliteal Aneurism, Lond. Med. Journal.—Sir Everard Home, Transactions of a Society for the Improvement of Surgical Knowledge. So Petit, Baillie, Pellitan, &c.—An interesting case under Mr. Lynn in the Westminster Hospital, Transactions of a Society for Improvement of Medical and Surgical Knowledge, vol. ii. p. 268.

ritous lotion or ice upon the tumour. In these circumstances, it has occurred, that entire coagulation has taken place in the tumour, the phenomena which I have described as attending the spontaneous cure.]

It might be imagined that, when it was once ascertained that, in all cases of external aneurism, the collateral arteries, that is, the branches from the main trunk, were capable of carrying on the circulation, nothing was more obvious and practicable than to tie the trunk.

But in tying the trunk, what becomes of the collateral arteries? This leads to the great principle of all—the *incision* for aneurism. If we could stop the main artery by any means which would leave the limb unaffected, uninflamed, then success would uniformly attend our efforts. But unfortunately, as in cutting down upon the artery, we excite inflammation in the limb, that inflammation produces swelling, and that swelling *compression of the collateral arteries*, and then comes mortification.

This course of reasoning shows also the extreme difficulty of curing an aneurism by compression. You cannot compress the main artery by any contrivance which shall not at the same time either compress the collateral arteries, or produce œdema, which is the condition of the limb most to be dreaded.

It was at one time a favourite conception of mine, that, in cases when it was difficult or dangerous to cut down upon and tie the artery above the tumour, we might tie the artery below as it passes out. I found that the idea had not only been entertained, but acted on. I feel impressed, however, that the operation has not been done with the nicety which is necessary to success in all operations on the artery.

[When a true and circumscribed aneurism bursts (if it be not still circumscribed, in which case I have called it a secondary aneurism) and the blood is diffused through the limb, the operation of Mr. Hunter will fail. When I have witnessed the attempt it has failed, and amputation has been resorted to. We have an instance from Mr. Cooper, Med. Chir. Trans. vol. xvi.]

Popliteal Aneurism.

The patient complains of pain, stiffness, and numbness of his leg. A tumour occupies the cavity behind the knee, and between the hamstring tendons. There is more of general fulness than of a prominent tumour, and a dull elastic beat is conveyed to the hands when you grasp the limb at this part. The patient tells you, very probably, that he felt a sudden shooting pain on leaping a ditch, or after a very long walk; and that from that time to the present, there has been a dull pain shooting to the sole of his foot, and some degree of swelling.

[You remember the nature and confines of the popliteal cavity, the bone anteriorly, the hamstring tendons laterally, and the fascia

behind and superficially. You recollect the relation of the artery covered by the vein and popliteal nerve, and how deeply seated it is. You at once see the consequence of an aneurism forming here—the compression of the nerve and consequent numbness, the compression of the vein and consequent œdema.

The old operation.—The old operation was performed thus:—1. The tourniquet was used; the patient was laid on his stomach, the back of the thigh consequently exposed. 2. An incision of six or eight inches was made over the popliteal cavity; the fascia was opened, the fat dissected through. 3. The sac of the aneurism was opened, and the coagulum removed. 4. The tourniquet was slackened, and the blood flowing showed the mouth of the artery. 5. A needle and ligature was passed around the artery above the rupture, and another was necessary below it.

From the principles endeavoured to be laid down, it is obvious what must have resulted from this procedure—general tumefaction, impediment to the free action of the collateral branches, and mortification.]

The operation of Hunter is performed on the fore-part of the thigh, where by a comparatively small incision, you find the femoral artery before it has perforated the triceps.

[Sir Everard Home said, Mr. Hunter changed the mode of operating in order to tie remote from the part that was diseased. Sir Astley Cooper makes his motive that he might leave the diseased parts undisturbed, and hence avoid constitutional irritation. The true effect, whatever may have been the motive, is to tie the artery without causing a general swelling of the limb.]

The *instruments* are very few: a scalpel with ivory handle, a blunt hook, directory, and an eyed probe and ligature, or aneurismal needle. The patient reclines.

1. The *incision* must be in length proportioned to the depth of integument, from three to four inches. Sir Astley Cooper says in the direction of the line of the sartorius muscle. I would rather advise that it be made in the line of the artery, obliquely crossing the upper edge of the sartorius one inch.

[If you cannot see the muscle in the aneurismal leg, or do not choose to be so free with it, you can bend the other thigh, and so cause the action of the sartorius; mark its exact place there, and, by comparison, note the spot where the artery crosses the muscle in the thigh to be operated on.

If you cut, as Sir Astley Cooper advises, take care of the saphena vein, which will appear at the inner extremity of the incision through the integuments.]

2. Having made the first incision, you come upon the superficial fascia, which is very thin over the sartorius.

[Look well that it be the edge of the sartorius which is at the lower extremity of your incision. I have seen sad mistakes, by the surgeon turning up the fibres of the triceps instead of the sartorius!]

3. Turn up the upper or inner edge of the sartorius a very little. The fascia is stronger beneath. You find tendinous fibres which pass over the sheath of the artery. Scratching these, you come on the proper sheath: you may pass the directory under those fibres of the fascia, and cutting on it you have the appropriate sheath of the artery.

[If the operation be featly performed, on opening the sheath you come directly upon the artery. The saphenus nerve is remote, and the femoral vein is under or behind the artery here. Sir Astley Cooper says he has seen the nerve included in the ligature—a sad error. I have seen the vein perforated with the aneurismal needle.]

4. When fairly within the proper sheath, and close upon the artery, you will have no difficulty in passing the probe or the blunt needle round the artery. But if you have not gone close upon the artery, you will have to bore and push to the danger of hurting the vein.

[The reader will peruse with surprise a paper in the 2d volume of the *Trans. of the Phys. of Ireland* on “Venous Inflammation.” “It was found that the crural vein, lying behind and in close contact with the artery where the operation had been performed, had been wounded by the needle.” Death was occasioned by inflammation of the veins. Again, and in another case, “the ligature had passed through the vein, and its coats were found in a suppurating state.”

I have been present when the blood burst out from the femoral vein on passing the needle. The cause is a too timid dissection of the artery, and boring through external to the proper sheath.

Scarpa's mode of raising the artery out of the wound between the finger and thumb, is quite out of the question.]

I have used a ligature of four moderate threads for this operation. Tie a single knot, and tie again. Separate the threads of the ligature, and cut all off but one thread. Bring the lips of the incision together with short straps of adhesive plaster. Lay the patient in bed, and enjoin perfect rest; ward off cough; avoid straining by giving mild laxatives; keep a warm stocking on the leg, but put no warm bottles to his foot.

[There is no use of keeping the two ends of the ligature here, as you have no intention of twisting them. The ligature comes away from the 12th to the 16th day. You may see if it be loose, but do not pull.

It was Mr. Abernethy's proposal, as well as Mr. John Bell's, to tie the artery twice, and divide it between the ligature. This is not the worst proposal, but it is properly objected to, as requiring more disturbance of the wound, and leaving two ligatures instead of one.

They thought by doing this, that they brought the vessel (by letting it retract) into the situation of the artery on the stump after amputation.

They, as well as others, missed the main distinction between an

artery tied in aneurism and in amputation. There is an influence of the living extremity exercised on the arteries which supply it. Whilst in aneurism, there is present that excitement on the circulation which carries the blood with force up to the ligature, in the amputated limb this excitement is entirely removed, and the activity of the arteries subsides.]

Of Inguinal Aneurism.

This aneurism forms in the bend of the thigh, just under the groin, and in its progress comes quite up to Poupart's ligament. Operate as soon as you can obtain consent after the case is declared. The danger is greatly increased if, by the bursting of the sac, a secondary aneurism is formed.

We are indebted to Mr. Abernethy for the improved operation on this aneurism. He had got engaged with one of Sir Charles Blicke's cases, in which he operated, the tumour being about to burst. He got his hands in the blood of the sac; found it necessary to cut up Poupart's ligament to get at the artery; and, as a natural consequence of all this, hemorrhage came on the 15th day after: the artery was tied again—burst again! Such is ever the consequence of those bloody operations on an aneurism where the sac is opened. Mr. Abernethy, urged by sad experience, resolved on future occasions to tie the artery above Poupart's ligament. Although in his first operation he failed, yet, by seeing the cause of failure, and correcting his method, he succeeded in establishing the operation.

The operation.—1. An incision is made through the integuments three inches and a half in length, in the line of the external iliac artery, as if you were about to cut into the abdomen; which, however, it is your purpose carefully to avoid. The lower end of the incision terminates at Poupart's ligament.

[Sir Astley Cooper, and after him Mr. Key, made a semicircular incision above Poupart's ligament, with its concavity towards the umbilicus, including the space over the inner abdominal ring.]

2. The second incision cuts through the tendon of the external oblique muscle, leaving entire the Poupart ligament and lower pillar of the ring.

3. Raise the margin of the internal oblique; put your finger into the internal ring, and push inwards the spermatic cord.

[You are on the outside of the peritoneum, and you carefully push up that membrane. This is an essential part of the operation. I have witnessed the operation fatal by peritoneal inflammation, in consequence of a very small wound of the membrane.]

4. You will feel the artery pulsating, but do not yet attempt to put a ligature round it. The fascia still covers the artery, (here your assistant must be active in holding aside the integuments:) you scratch and by little and little, open the fascia. You have still the proper sheath; it is to be opened in the same way.

[A gentleman in operating says, "I endeavoured to separate the vessel, but could not succeed either with my finger or the point of the aneurismal needle; with the scalpel, therefore, I made an incision on each side of it, and then," &c.—*Med. Chir. Trans.*, vol. xi. p. 399.]

This will always be the case unless these two things are attended to—to scratch and open the iliac fascia, and to lift the thigh and relax the parts.]

5. Now make the assistant raise the thigh, whilst you with your fingers and thumb take hold of the artery, and without dissecting further, you can pass the blunt aneurismal needle under the artery, and so tie it.

[You may be embarrassed by the long lymphatic gland that lies within Poupart's ligament; in that case push a little higher.]

Mr. Abernethy dissected on the two sides of the artery; it is better to touch the sheath, and touch again and again directly over the artery. The difficulty he encountered was obviously from not getting within the sheath.

Be not too rude in fingering and lifting the artery. An aneurism in the groin implies a very diseased state of the arterial system; and I have seen this artery give way between the operator's fingers. Pay special attention to the vein on the inside. If opened, it would prove more disastrous than wounding the artery.

Mr. Cline's son proposed as an improvement, that we should tie below the giving off of the epigastric and circumflex arteries. This was treading backwards. The advantage from Mr. Abernethy's mode of operating is, that you have the whole length of the external iliac artery above your ligature without a branch going off.]

The Operation on the Internal Iliac Artery.

This operation was first performed by Mr. Stevens; after him the operation was performed by Mr. Atkinson of York and S. Pomeroy White. (See *American Journal of the Medical Science*, February 1828.)

These aneurisms of the hip can hardly be occasioned by disease of the artery (gluteal or ischiatic.) I imagine they result from falls and kicks.

See that you do not mistake some great tumour projecting from the pelvis, and receiving an impulse from the arteries, for an aneurism. The operation has been performed under this mistake; therefore take care it be not done again.

The operation on the internal iliac artery, or on the common trunk, is a pure piece of dissection. The surgeon should study these operations on the dead body. The method and the principle are the same as in the last operation; the incision of the abdominal muscles must be larger,—the peritonæum must be pushed up to a greater extent. It carries with it the ureter, and care of that duct is the additional caution I have to give.

Carotid Aneurism.

The aneurism of the carotid artery takes place at the bifurcation into the external and internal carotids, just where the angle presents opposition to the stream. You perceive then how close the tumour must be upon the throat. From this circumstance arises the peculiarity of the case.

[When a student in this Hospital (Edinburgh), I informed my brother that I thought in the Physician's Ward they were poulticing an aneurism of the carotid artery, and I drew his attention to it. In that case I observed an important fact: the woman died of suffocation. I made the dissection.]

Many years after this, in London, when there was great talk among our students of Sir Astley Cooper being about to tie the carotid artery for aneurism, I said the woman would die of suffocation, and so she did. In that case the report proceeds: "Immediately after the operation she was seized with a fit of coughing which continued half an hour." At a farther stage, "the wound opened, the tumour increased and was painful; she had a violent cough, great difficulty of swallowing, and a high degree of constitutional irritation."

Sir Astley saw the reason of this misfortune, which I hope you also perceive,—operating too late. By operating early, whilst yet the tumour was small, he succeeded, and established the operation.

Some confused ideas of danger from tying the carotid, were entertained in consequence of Mr. Abernethy's case. Mr. John Bell had tied the carotid in a case of aneurism from a puncture with a pen-knife.]

Your course of reasoning upon the operation for carotid aneurism will run thus: 1. The ligature of the artery in a case of aneurism causes a certain excitement in the tumour. 2. Without this addition the aneurismal tumour, by pressing on the larynx (and it may be, on the laryngeal nerve), endangers suffocation. 3. The excitement of the operation,—the disturbance of a large tumour causes an increase of pressure, perhaps involves the parts in inflammatory action, and causes suffocation. The corollary, therefore, is,—operate early.

Operation.—The instruments are,—the scalpel, blunt hook, and aneurismal needle,—the assistant has his flat hooks to hold aside the integuments. These are all that are necessary,—a sensible man will, besides, have the usual resources against untoward accidents.

1. An incision two inches and a half in length, along the anterior edge of the sterno-cleido-mastoideus muscle.

[The length of the incision must be left to the good sense of the operator; let him keep as free as possible from the tumour. It is always a misfortune when the inflammation of the incision communicates with the tumour.]

2. The second incision cuts the platysma myoides, which should be opened up to the full extent of the skin.

3. Relax the mastoid muscle, use the handle of the knife and go under it. You come upon the omo-hyoideus. *Scratch* so as to come upon the common sheath, just below the edge of that muscle.

4. In one sheath of cellular membrane, the artery, jugular vein, and par vagum lie. You feel the pulsation; open the sheath on the side towards the trachea,—so you will avoid the jugular vein, which is on the outside.

[If care be not taken, the jugular vein swells up. Thus Sir A. Cooper:—"The motion of the vein produced the only difficulty in the operation." Again, "It sometimes presented to the knife tense and distended, and then as suddenly collapsed." You understand this to be the effect of respiration, in the alternate freedom and resistance to the descent of the blood. The finger of the assistant should prevent this occurrence.]

5. By scratching with the point of the knife, the back turned, you open the sheath; and when this is done you will have no difficulty in passing the blunt hook round the artery; after which you pass the blunt needle and ligature, and tie as in former cases.

[Your safety is in keeping close to the artery, by which you leave the great 8th nerve, in its proper division of the cellular sheath, unexposed. The recurrent is out of the way—out of the question. You do not interfere with the descendens noni.]

Axillary Aneurism.

Here too the operation must be done early, to give hope of success. I consider it by much the most difficult and hazardous operation received into the order of acknowledged operations.¹ It has often failed, and good surgeons have stopped, *re infecta*. It is not perhaps considered that much must depend on the circumstances; for example, when the tumour is large, and the shoulder pushed up, the artery must relatively be the deeper.

Operation.—Your aim is to expose the artery as it emerges from the scalenus anticus muscle. 1. The incision through the skin and platysma myoides runs from the outer edge of the sterno-cleido-mastoideus to the anterior edge of the trapezius, parallel to the clavicle. The upper edge of the integument may be cut in a line perpendicular to the first, so as to give more room in this difficult dissection; nor need you spare a few fibres of the clavicular portion of the mastoid muscle. 2. The fascia here must be cut through, and it is an irregular one, being mixed with adipose membrane: you take care of the external jugular vein, which falls in amongst it. 3. You meet the lower edge of the lower belly of the omo-

¹ The subclavian artery successfully tied in a case of aneurism of the axillary artery, by Mr. Key, Med. Chir. Trans., vol. xiii. p. 1; by Mr. Fergusson, Edin. Med. and Surg. Journal.

hyoideus ; expose it. It is to be regretted if you open the supra scapular artery ; if you do, it must be immediately tied. In your further progress, take the scalenus muscle as a guide, and follow it to its attachment to the rib. You then feel the artery. The remaining part of the operation is performed as in other cases of tying a large artery. Keep close to it in passing your ligature.

[It has been proved possible to mistake the nerves for the artery ; they come down from above, and are behind the artery.]

We have lately had an operation of tying the *arteria innominata* in the Hospital. I came too late into consultation, or I would have protested against the operation. It was dexterously performed by Mr. Lizars, but the patient died.

Aorta.

Mr. John Bell proved that the aorta being obstructed, the collateral vessels were sufficient to the circulation. Sir Astley Cooper tied the aorta. Mr. James, *Med. Chir. Trans.*, vol. xvi., repeated the operation, obviously under the idea that he was doing a very meritorious act. The case needs no comment. Let me add, that Mr. John Bell, by his instance, was enforcing the doctrine, that whatever artery could be tied, the circulation would be carried on. He never contemplated cutting into the abdomen and turning out the intestines to tie the aorta.

[Were it proper to repeat this operation, it might be done differently.]

CHAPTER XXVI.

ACCIDENTS FROM BLEEDING IN THE ARM.

When you bleed in the arm you select the most prominent vein, —the median, basalic or cephalic vein. In very fat people, the bending of the arm keeps the former more distinct and superficial. Take the left arm ; smooth the skin as you apply the ribbon ; place yourself on the left side of the patient, who reclines, the arm being held horizontally. Turn the arm round, so that the orifice you are about to make presents to the cup or basin. The band is two inches above the point you are to strike. You press the vein below, which distends and keeps it steady. You do not prick the vein, but pass the lancet into it on one side, and obliquely across it. The point of the lancet should make a part of a circle.

When you desire to stop the bleeding, undo the band or ribbon, and press your thumb an inch below the bleeding orifice, so as to stop the course of blood to it : wipe very clean ; stretch the little cut

in its length so as to bring the lips together; place the compress of lint so as to keep the lips together; apply the bandage by turning it above and below the elbow in figure of 8; bend the arm gently; put it in a sling, and enjoin the patient not to use it.

[The most common mishap is thrombus, from first opening the vein and then turning the arm, so that the orifice in the skin does not correspond with that in the vein.

If the patient's constitution be irritable, the orifice may inflame; the inflammation is, however, more commonly caused by moving the arm too soon. The out-patients of an hospital bled in the surgery, complain of a foul lancet, when the cause is their own carelessness.

The inflamed orifice must be attended to, as it may lead to serious consequences—inflammation, pain and contraction of the arm, or, worse still, inflammation of the vein.

The lymphatics may be inflamed in consequence of the orifice festering; then there will be tenderness, and, it may be, suppuration of the axillary glands.]

As to the pricking of a nerve, the subject is very obscure. I have known a patient start in bleeding from an indescribable sensation, extending from his shoulders to his finger ends. I have known a patient attribute his state (a mild form of tetanus, the attack of which commenced with a sensation of water trickling down his arm) to a nerve picked in bleeding. These certainly are more like the effects of an injury to the nerve than the symptoms narrated by Mr. Abernethy. I cannot countenance the idea of dividing the nerve supposed to be punctured.

Aneurism from Bleeding.

When the surgeon bleeds in the median basilic vein, he is directly over the brachial artery, the fascia only intervening. A blunt lancet in the hands of a *bleeder*, which passes with difficulty and starts through, or the sudden start of the patient, may endanger the pricking of the artery. But there must be something awkward in the operation, as the vein must not only be transfixed, but the fascia and the coats of the artery also.

When this happens, the blood will flow florid and per saltum, and be with some difficulty restrained, so that the compress is put down firmly.

[Mr. Syme, in his excellent work, *The Principles of Surgery*, p. 97, hints at the high bifurcation of the artery, and the superficial course of the radial artery, exposing it to be mistaken for a vein, and opened as such. I have not seen such an occurrence.]

When the tumour forms, it has the cicatrix on its centre. It is at first compressible, but at length the connections under the fascia being broken up, and the coagulum forming and impacted, you cannot compress it; the tumour is now more diffused, occupying

the bend of the arm, and the arm and the fingers are contracted from the distention of the fascia.

Owing to the smallness of the puncture made in the artery, and the firm bandaging, there is time given for the cellular membrane to become condensed, so that the aneurism is *circumscribed*.

A question arises out of this: Shall we imitate the operation of Hunter, in simply tying the artery above the tumour, or shall we open the sac of the aneurism, and treat the case as a wounded artery, tying the artery above and below the wound? I have seen it successful in both these ways. I incline to the operation by opening the aneurismal tumour.

Operation.—1. Apply the tourniquet. 2. Make an incision over the face of the tumour; the fascia is exposed, splendid in its fibres over the mass of coagulum. 3. Penetrate and slit up the fascia, (always thinking of the possibility of there being a high bifurcation.) 4. Roll out the coagula; sponge out the chasm; the bottom of the sac you find dark and irregular from driven blood; you hardly expect to see the artery. 5. Let the assistant unscrew the tourniquet, when a jet of blood flows from the orifice; at that moment introduce the probe into the orifice, and screw the tourniquet. 6. Lift up the artery by means of the probe; pass a double ligature under it; cut off the needle, making two ligatures; push the one above the orifice, the other below it, and then tie above and below.

[It is enough if I say that I have seen a dive made with a sharp needle, include both nerve and artery,—the patient died.]

Do not dissect and separate the artery. It is wrong on principle; and the puncture is so near the going off of the radial and ulnar arteries, that you might cut one of them across.

You lay out the arm in an easy posture; with light dressing; the wound must suppurate.]

The operation of tying the trunk of the brachial artery above the tumour is a simple and masterly one. 1. Let the incision be made free of the aneurismal tumour, of two inches in length, and direct on the pulsating artery. 2. When you have dissected down upon it, you feel it, and see it pulsating round, distinct and white. But take care,—it is the radial or median nerve you see; the artery is under it, nearer the bone. 3. Hook out the artery with the blunt hook, from between the nerve and vein, and put a single ligature round it. Compress the artery, and observe the effect on the aneurism; then tie it.

[The vein over the artery is that formed by the junction of the basilic and deeper veins.]

Varicose Aneurism,

Sometimes called aneurismal varix, is also a consequence of transfixing the vein in bleeding in the median basilic, and opening the artery. For when the surgeon is alarmed by the difficulty of

stemming the flow of blood, he puts down the compress with more than usual firmness. The effect of this is to bring the orifices made in the two vessels closely together, whilst the surrounding parts adhere. Perhaps a clot for the time keeps the passage open. However that may be, a communication being formed, and the impulse being taken off from the artery by the easy passage of the blood into the vein, the varix or dilatation of the vein is the consequence.

I believe, however, that the case is often somewhat different. It is thus, at least, that I have found it. An aneurismal tumour forms under the fascia, and in immediate contact with the artery. This aneurismal cavity communicates through the fascia with the vein. In this latter case, the dilatation of the vein is not so considerable, nor does the dilatation extend so far into the neighbouring veins.

You know the case by the pale blue tumour of the vein, with cicatrix in the centre. You can empty it. If, on emptying it, you compress the veins of the fore-arm, and put your finger on the communication with the artery, the tumour does not rise; but it rises on removing the finger. On putting your ear to the arm, you hear a trilling sound of the blood flowing from the artery into the vein.

On farther examination, you will find that the brachial artery beats inpetuously, and that it has become both larger, and much more tortuous than natural.

[When the brachial artery divides high up, the radial artery takes a course not only under the median basilic vein, but very superficially, having only a few fibres of the fascia covering it. This artery is thus much exposed, and sometimes forms the communication with the vein.]

You should let this kind of aneurism alone; not even a compress or bandage to be used. From what we have learned of the aneurismal tumour, we perceive that, in the varicose aneurism, it is the free exit of the blood, the ready passage it has back to the heart, by the vein, that prevents the walls of the aneurism from dilating and becoming a common aneurism.

If an operation is to be performed, it must be an incision down to the punctured artery; which must be tied above and below, according to the rule laid down for wounded arteries (see pages 32, 34). By tying the artery on the inside of the elbow, and above the tumour, I lost my patient,—the arm mortified.

[The artery being very easily cut upon and tied, you might naturally think, as I did, that it would only have the effect of diminishing the force of circulation, and secure the patient from the chance of rupture. But the effect is an immediate loss of circulation in the arm and hand. The reason is this: In the common case of an artery tied in aneurism, the blood flowing by the anastomosing vessels to the artery below the ligature,—these vessels are full of blood, and work to the supply of the limb. But in this instance, the blood of the artery having a free communication with the vein,—that tension and fulness necessary to their activity never

takes place; the hand and arm become immediately pale, a painful tingling succeeds; the nails and fingers become blue, and next day the arm is mortified!"

CHAPTER XXVII.

OF ANEURISM BY ANASTOMOSIS.

Surgeons confound aneurism by anastomosis with cutaneous nævus. Fungus hæmatodes also gives occasion to mistakes.

The term *aneurism by anastomosis* was given by Mr. John Bell, who first described the tumour; and any one who has seen and fingered the disease will acknowledge it to be a proper term.

[During the last winter, a young gentleman came to Edinburgh with this tumour. I sent him to Mr. Syme for consultation, and also as a good instance of the particular form of the complaint to which my brother had given this term. A colourless mass occupied the side of the throat and jaw, which you could gather with your fingers, soft and compressible, and which being so grasped gave a powerful pulsation to the hand.

I have had an example of the disease in a young lady's hand. The soft and woolly mass surrounded the wrist and thumb, entered into the interstices of the metacarpal bones, so as to form a communication between the portion of the mass which lay on the back of the hand and that in the palm.

The question in consultation (before her marriage) was, whether two arteries of the wrist should be tied? I gave it as my opinion that they should not.

This was outwardly and visibly an instance of the tumour which my brother has described as lying between the rectum and vagina.]

This species of aneurism has no malignant character. It is not like a tumour properly. It is a congeries of arteries and veins, in which the union of their extremities is apparently so free as to communicate the impulse of arterial action to the veins.

I see from time to time what appears to be the same structure, with more of the venous or varicose character, and without pulsations.

Such a tumour may be treated as a *nævus* (see Tumours,) when it is small and circumscribed; but as it has presented to me, extirpation was impossible.

¹*Aneurismal varix* has been produced by accidental wounds, which have transfixed both artery and vein; for example, in the ham. A most extraordinary case spontaneously produced by the communication of the aorta and cava is given by Mr. Syme.

Is it possible to arrest the growth of such a disease by tying the artery which feeds it? I fear not. In all cases the inoscultations of the arteries are so free, and they enlarge so readily, that there is little hope of the vascular mass decaying by this process.

The practice is indeed of very doubtful propriety in any case of pulsating tumour. In consultation not long since, in London, on a tumour of the face, and quoting the advantage of tying the carotid artery as an instance of the effect of diminishing the force of circulation, I was met with the unanswerable remark, "I have that tumour in a bottle," and this was obtained by *dissection*: and so I fear it will be, that if any advantage be gained, it is only temporary, and we cannot destroy the disposition.

[In the 15th volume of *Med. Chir. Trans.*, p. 170, you will see that Sir Astley Cooper put ligatures on four arteries which supplied a tumour on the head, without permanently diminishing its volume.]

Inflammation of Veins.

The inflammation of the veins is almost a new subject. It appears that many must have died of inflammation of the veins without a suspicion of the cause. Mr. Hunter gave a beginning to this inquiry, as he did to many others. See a paper in the *Transactions of a Society for the Improvement of Surgical Knowledge*, vol. i., in which he shows how liable the vein is to inflame after bleeding, and with what formidable consequences. Sir Astley Cooper assigns this inflammation chiefly to the previous bad health of the individual, and to the irritation occasioned by the patient using the arm.

On the attack, the patient complains of tenderness, and requires the bandage to be loosened. There is pain on extending the arm; the lips of the wound pout; the veins of the forearm swell; the basilic and cephalic feel solid; then commence constitutional irritation and fever, and abscesses form in the course of the veins. The fever is of a typhoid character—the pulse feeble—the skin hot—the tongue brown—the respiration anxious—pain in the head and back—prostration—delirium.

On *dissection*, the appearances are—thickening in the coats of the vein—coagulable lymph and pus within them.

The veins in the stump after amputation are very apt to inflame. This is made an objection to tying the veins; but unfortunately the open mouth of a vein in a suppurating stump is fully as liable to inflame.

In Cooper and Travers' *Surgical Essays*, you will find them attributing the inflammation of the vein to the ligature. The patient, after amputation, has frequent rigors; the thigh is painful on pressure; a low fever succeeds, and delirium; the dissection exhibiting diffused inflammation in the vein, with coagulable lymph extending to the heart.

[See a paper in the 2d vol. of the Transactions of Physicians of Ireland. Read my former colleague Mr. Arnott's paper, Med. Chir. Trans. vol. xv., part 1.]

There succeed to the surgical authorities the reporters of some very important facts. My old colleague, the late James Wilson, found pus in the veins of the uterus, and the cava obliterated, in three women a few days after parturition.

Phlegmasia dolens is by some attributed to the inflammation of the iliac veins, in consequence of inflammation of the uterus. Dr. Davies first observed the inflammation in these veins, and Dr. Lee traced it to the uterus. But our experienced and acute professor of midwifery says they are confounding two distinct cases—*phlegmasia dolens* and crural phlebitis.

I confess the subject is to me still obscure, and the puerperal fever, *phlegmasia dolens*, and phlebitis, require further elucidation.

CHAPTER XXVIII.

DISEASES AND INJURIES OF THE NERVES, AND THE OPERATIONS PROPOSED FOR THEIR RELIEF.

[I must refer my reader to my volume on The Nervous System, both for the anatomy of the nerves, and for many interesting circumstances connected with their pathology, which cannot be introduced here.]

When a nerve is divided across, it cannot be perfectly restored; it unites, but a thousand chances are against its union—filament to filament. Sensibility is in part restored, but it is neither a perfect nor a natural sensibility which returns; a somewhat painful vibration is conveyed, instead of the perfect sense of touch.

[Nervous matter appears to be secreted between the extremities of the divided nerve with a knot or degree of tumour, and this part is very sensible; it requires to be protected.]

The nerve cut across in amputation undergoes a remarkable change. (See *Amputation*.) Coagulable lymph is deposited in the coverings of the nerves. The great size of these tumours on the nerve mark something peculiar in the membranes, or unusual excitement.

Inflammation of a nerve is a very serious complaint. Mr. Cline said to me in consultation, "I have known a man die from inflammation of the ischiatic nerve." A nerve may be inflamed by direct injury—a bruise. A gentleman came to me in the present season, whose narrative of symptoms gave the idea of "a creeping palsy" on one leg and thigh. I found he had been thrown from horse-back, and had bruised the ischiatic nerve twelve months before.

One can believe what Portal affirms, that a child falling from a height bruised his schiatic nerve, and that thence arose atrophy of the extremity. (Portal, vol. iv. p. 297.)

Formidable disease of the nervous cord may be produced by a bruise. A ship-carpenter fell from the side of a ship: he was caught by the ham on a bolt which extended from the side of the ship, and hung there. The remote consequence was, disease in the body of the popliteal nerve, attended with excruciating pain in the sole of the foot!

Inflammation of a nerve—a circumscribed inflammation of a nerve—may be produced by constitutional causes. I have found the most excruciating pains in the course of the distribution of four distinct nerves at the same time; pains in the course of the ulnar nerves of both arms; pain in the course of the fibular nerves on both legs, and to a degree that made the sufferer howl! In all these nerves I found a spot tender when pressed.

The nerves appear to be more extensively or generally the seat of pain, proceeding from inflammation. Miss F—— I visited in the most pitiable condition. She lay coiled up and paralytic, and with sloughing through want of sensation, while suffering the most extreme agony in the whole frame, and in which condition she sunk.

I entreat attention to the seeming contradiction of insensibility and extreme pain in a part; for that is the character of actual disease in the nerve distinguished from *neuralgia*.

The ischiatic nerve is more frequently the seat of pain than any other, if we except the fifth nerve of the head. 1. There is pain from inflammation in the nerve; (that inflammation may be from a cause constitutional, or from injury). 2. The nerve may be involved in inflammation proceeding from the hip; (hence the confusion under the head of *morbus coxarius*).

The schiatic nerve is especially subject to inflammation, from which result pains of the nature of rheumatism. Some of the better French authors treat of an “engorgement sereux” of this nerve, from which come not merely defect of motion, but an atrophy or wasting of the hip and limb; which proves, says *Portal*, that the nerves are the source of nourishment as well as of action. However, you will not subscribe to this conclusion, but only believe that a part being left inactive, degenerates.

Let me, however, remind you how many different sources of pain there may be, before we fix on actual disease of the ischiatic nerve as the cause of symptoms. 1. Inflammation in the joint; 2. Rheumatism of the hip; 3. Disorder of the kidney; 4. Accumulation in the colon; and, 5. Disease within the pelvis.¹

Disease within the pelvis will give rise to pain in the course of

¹ The remedies are; internally—calomel, opium, and antimony, turpentine; externally—warm bath, stimulating embrocations, and plasters, blisters, moxa, &c. See *Tic Douloureux*, App. to Nervous System.

the distribution of the ischiatic nerve. Thus cancer of the uterus, involving the sacral nerves—so also disease of the rectum—will be attended with spasm in the calf of the leg, and pain in the sole of the foot. So will the presence of the child's head in labour, when it rests in the hollow of the disease cause spasms in the limb.

Nerves, especially cutaneous nerves, are liable to have formed upon them extremely sensitive tumours. I have found them on the cutaneous nerve of the fore-arm. Portal uses the word "*durillons*." Camper speaks of them, and says, "*Pisi magnitudinem non excedunt*." You know them from their exquisite sensibility, and the sensation that runs down the nerve when they are pressed. I have known them dissipate by being entirely covered up; but in general they require to be cut out. I have known fungous disease in the larger nerves, and death from the extreme pain and burning in the extremity.

It is necessary, in the investigation of nervous diseases by dissections, to notice, that the cord of a nerve becomes soft and transparent from two opposite causes—1. Inflammation; 2. want of use. In a paralytic limb, the nerves are shrunk, and have lost their opaque white colour. So when the sight of the eye has been for some time lost, the optic nerve is seen wasted and transparent.

Two circumstances, if joined in your estimate of symptoms, will be of the utmost consequence in the investigation of obscure nervous diseases—the knowledge of the course and distribution of a nerve—and the effect of pressure or disease occurring in any part of its trunk. Thus we have seen the advantage to be obtained in this way, in judging of the course of balls, and so we may in conjecturing on the seat of sacrum.

But there is a branch of this injury less understood, which is the pain in a remote or external part, when the irritation which produces it is internal or visceral. I do not profess to give a satisfactory explanation of this occurrence, and yet it is so important to the practitioner to hold the fact in his memory during the investigation of disease, that I shall state an hypothesis, allowing the explanation to rest on a principle not yet proved. If a nerve divides, and one branch goes internal and the other to a superficial and sensible part, the irritation on the internal branch will give disturbed sensation to that external part where the extreme branch terminates. Or again, a filament of a nerve not sensible, in the common acceptation, being included in the sheath with a sensitive cutaneous nerve, the morbid sensation will be in the extremity of that cutaneous nerve. The most familiar example is disease in the liver, attended with pain in the shoulder. But you may take it as a general law: disease in the throat—in the heart—in the stomach and duodenum—in the colon—kidney—uterus—have their symptoms in pain referable to the parts external, as the back of the neck, the mamma (see disease of Mamma), the elbow, the scapulæ, the back and loins, and the perineum.

If we cannot satisfactorily account for these symptoms, yet they

correspond with the anatomy. But there are others in which the knowledge of the distribution of the nerves give us no assistance; I mean those neuralgic pains where there is neither disease in the part, nor in the root or course of the nerve. We meet with distressing cases of pain in a single toe—in a single finger—in the course of cutaneous nerves, and, lastly, in the face or eye.

On the affections of the fifth nerve of the face, I cannot do my reader justice without referring him to my volume on the Nerves. He will find there reason to believe that the fifth is the most exquisite in sensibility, and the most varied in function of all the regular and systematic nerves, and most frequently the seat both of neuralgic pain or *tic*, and of actual disease. I cannot now write with half the interest on this subject which I once did, and therefore I shall transcribe the following account of the disease of the fifth nerve.

“Of Painful Affections of the Face from Disease of the Fifth Nerve.”

[“The painful affection of the face called *tic douloureux* is seated in the fifth pair, and for the most part in the second division of this trigeminus nerve; and so convinced am I that it is the more direct connection established betwixt the sympathetic nerve and the fifth that produces this pain, that I could wish to divide the sympathetic in the neck, if I thought it could be done with safety, which it cannot.

“The pain of this disease is inexpressibly severe. In the note of the case from which I now quote, the paroxysm begins with much sneezing, and itching of the side of the fore-head: the pain begins at six o’clock, and continues for twelve hours, when it is at its height; then the patient cannot speak, owing to the severity of pain; she lies on her right side, and keeps the fingers pressing the temple. As to the kind of pain, I get nothing but this expression:—‘It is an overbearing pain.’ It does not throb; there is no burning sensation, but a shooting and darting; it goes off at once; her head begins to itch, and as soon as the pain is gone she is quite well again.

“The seat of the pain is in the right temple and the side of the right eye; sometimes it begins in the right side, and then shifts to the left side, quite as painfully. In the case from which I take this note, the patient says the attack is preceded by a weakness in the stomach, ‘as if something were alive,’ and it goes off with the same sensation.

“In another case the pain came more suddenly, and struck with more violence in frequent shocks, like those of electricity, and in this patient, too, there was an attempt to stop the suffering by pressure on the nerve. By his experience he had discovered the anatomy of the fifth pair of nerves; for, on the sudden recurrence of the pain, I have seen him apply his hands to his face, and press a

finger firmly on all the points where the branches of the nerve make their exit from the bones of the face; pressing one finger on the infra-orbital hole, another upon the inner canthus of the eye, a third upon the frontal nerve, and a fourth before the ear; and he would stand so, fixed in posture and trembling with exertion.

"I have an instance before me of the lingual division of the fifth being similarly affected. 'In this lady the pain in the tongue is sometimes in the papillæ, near the root, sometimes in the tip, but always in the same side of the tongue. There is no difficulty of speaking, unless from the pain, and yet it is not a soreness, but a burning and smarting—sometimes the whole mouth is affected, even down to the throat, burning like fire.'

"*There is a division of this class of diseases which must be distinguished*—painful affections of the face, which do not come from irritation through the sympathetic system of nerves, but from direct injury to some branches of the fifth pair itself; but where the pain is referred to a different portion of the nerve, and generally to the cutaneous or more superficial branch. We have an instance of this in the severe pains which attend the shooting up of the dens sapientiæ in a narrow jaw; in the distress which attends disease of the antrum and caries of the bones of the face, through which the branches of the fifth pass to the face.

"*Note.*—Mrs. S. For fourteen years she has experienced pain in the *eminentiæ frontales* (she places the points of her fingers there); of late the pain has been more in the root of her nose; when seized with a paroxysm, the tears flow from her right eye in a stream; when she touches the right nostril a pain strikes to her forehead; sneezing, and still more coughing, gives her great pain; laughing and crying have the same effect; bringing the teeth together brings on the pain; washing the right cheek with a soft sponge brings on the pain; any change in the temperature of the atmosphere affects her; when she goes into the open air, or when, after having been out a little, she comes into the house, a sharp pain darts up to the forehead. On examining this patient's mouth, the teeth were observed to be black, and the gums unhealthy and ulcerated; on removing two of the anterior molares of the upper jaw, matter flowed from the antrum. On her next visit, I still found the fangs of another tooth remaining buried in the gums, and the adjoining teeth black and the gums spongy. These I ordered to be removed also. After this she could press the side of the face without exciting pain, or bringing on the paroxysm, as heretofore. On her next visit, the gums appeared healthy, the pains were much relieved but still periodical: the solution of plumbi acetæ and opium externally applied continued to give her immediate relief.

"Such are not the symptoms of the true *tic douloureux*, but of that case where the internal branches of the fifth pair, being irritated by disease, produce pain in their external branches.

"We have another set of symptoms, and from a more formidable

cause, in the following note, which I take also from my private case-book.

"Mrs. F.—The burning sensation commenced on the left side of her tongue, and has gradually increased for twelve months, until it now extends over half the tongue, and mouth, and face, and head. It is a sensation as if her mouth were burnt; she had lost the sense of taste in the affected side of the tongue; she is not aware when a portion of meat is lodged betwixt her tongue and cheek. There is a numbness of the corresponding side of the face, which she says is like the pricking of a thousand needles, as when the hand or foot goes to sleep by pressure on the nerves. The end of a feather passed three inches into her left nostril gives her no sensation, and does not produce sneezing; yet she has the smell of both nostrils. On making her describe the extent of 'deadness' with her finger, she runs it round the left side of the chin, and on the side and ridge of the nose. She imagines that there is a dryness of one side of her mouth, but it is not really so; there is no difference in the sides of her mouth to appearance. The pain is aggravated by speaking or by eating; and still more by coughing or sneezing. When she moves and twists her face, she says there is much stiffness to her feeling; but the action to all appearance is quite entire. She says that 'the side of her face is, in a manner, dead; and yet it cannot be dead from the constant pricking upon it.'

"The affected side of her face is subject to become swollen, red, and livid, and extremely hot; so that to allow her to sleep, she must then keep the lotion applied. She says she thinks she must die but for this lotion (solution of opium and plumbi acetat.) It is remarked, that to relieve a painful itching at the back part of her ear and on the temple, she pinches the skin, but does not scratch it, for then great suffering is the consequence, and the pain extends all over the side of the face.

"Such symptoms I conceive to come from direct disease of the fifth nerve, or from inflammation involving it.

"Continuation of the preceding case by Dr. Whiting.

"Mrs. F. called on me, August 2, 1827, for advice for a disease of which she gave me the following history:—

"Twelve months previously she first felt an unusual sensation on the left side of the tip of her tongue as if it were burnt; this feeling soon extended over the left half of the organ, and afterwards over the left side of the palate, gums, and face; it was accompanied by an almost total loss of the sense of touch in the parts affected. The uneasiness had been constant from its commencement, increased, however, by the motions of the face, and by the contact of the hand on any solid body.

"At the period when I first saw her, the boundaries of the disease were, the ridge of the nose, the raphe of the upper and lower lip, the lines which mark the division of the right and left sides of

the palate and tongue, the margin of the left lower eyelid, the anterior edge of the meatus auditorius externus, and the horizontal ramus of the lower jaw. In none of the other parts of the face was there any evidence of disease. The morbid condition of the parts affected was as has been described; both taste and feeling were lost from the left side of the tongue, so that she was obliged to chew on the right side only, and if the food lodged at any time between the teeth and cheek in the left side of the mouth, she was obliged to remove it with the finger. The motions, however, of every part of the face were properly performed, the features not at all distorted, the tongue protruded in a straight line, the temporal and masseter muscles appeared to act powerfully on both sides; she had no difficulty in utterance, except occasionally, when much excited; her general health seemed good, her appetite was strong, her bowels were confined, and her tongue rather white. Since the age of twenty-one a violent headach had frequently distressed her, which she described as going off by the face; it was accompanied with sickness and vomiting of bile: this headach had continued to return at intervals since the commencement of her present ailment.

“On 8th October, 1827, I find I reported that the symptoms had gradually increased in severity, and the disease extended somewhat beyond its former boundaries.

“September, 1828.—From the last date to this she had been nearly lost sight of by me; she had been for some time under the care of Mr. Charles Bell. On visiting her at this time, I found that she still had a distressing sensation on the left side of her face, &c., although altered in its character; her speech had become indistinct, her face was drawn to the right side, the masseter and temporal muscles of the left side had ceased to act, the tongue was protruded towards the left side, the hearing of the left ear had ceased; she could raise the left upper eyelid by voluntary power, but could not keep it elevated; the effort to raise the globe of the eye was attended with headach and giddiness; there was considerable secretion of tears; she was emaciated and bed-ridden, and complained of great and constant pain at the back part of her head.

“About a month before her death her intellects became confused, her breathing difficult, her speech quite indistinct, and her deglutition impeded; she occasionally ground her teeth with violence, and her jaws were often firmly clenched, apparently by the contraction of the muscles of the right side; she seemed to die at length (in February, 1829,) from difficult respiration, and want of the power of swallowing.

“*Post-mortem appearances.*—The frontal bone was more than one-third of an inch thick, and studded with numerous granulous eminences, causing corresponding indentations on the surface of the brain; the vascularity of the dura mater was increased, but not more adherent than usual to the bone; the substance of the cerebrum and cerebellum had more blood than it is generally found to contain after death, but was otherwise of a healthy appearance;

about one ounce and a half or two ounces of serous fluid was found in the ventricles; a tumour containing fluid of the colour of urine (considerably darker than that taken from the ventricles,) about the size, and not unlike the form, of a pigeon's egg, was discovered on dividing the tentorium on the left side, bounded by the petrous portion of the temporal bone, the pons varolii, and the left lobe of the cerebellum; the part next to the pons had contracted a slight adhesion to it, and had, by its pressure, produced considerable indentation on the left side of it; the tumour seemed, on minute examination, to be a growth from the inferior surface of the crus cerebelli, just behind the junction of the pons varolii; this morbid growth consisted of a bag, partly membranous, and partly medullary, the interior of which was cellular, and containing a fluid, which has already been described in a manner, not very unlike the vitreous humour of the eye, excepting the colour of the fluid. The first and second pair of nerves on the left side were as usual; the third was slightly displaced by the tumour; the fourth undisturbed; the fifth appeared to come from the fundus of the tumour, passed under the dura mater at its usual place; it was flattened and thin as if from pressure, and could be traced along the coat of the tumour no further than within about half an inch of its origin. The sixth pair was healthy; but the seventh, both portio dura and mollis, was completely involved and lost in the tumour from a quarter of an inch from its origin to the meatus internus; and into this foramen no nervous structure could be seen to enter, but a substance resembling the membranous portion of the tumour and apparently a process of it; both portions of this nerve, however, were distinct from each other at their origin, and of their usual appearance.

JOHN WHITING, M. D.

" '250 High Street, Southwark, March, 1829.'

"From whatever cause it may proceed, whether from the more exquisite sensibility of the fifth nerve, or its more remarkable connections, certainly all nervous affections are peculiarly apt to fall with a concentrated force upon it. Thus, in injuries of other nerves, the first symptom, before the affection spreads to the other voluntary muscles, is stiffness of the jaws. In several instances of injury of the nerve in amputation, also when the nerves have become entangled in the cicatrix of the stump, the pain has struck into the face and jaws, producing a tic.

"Returning to the subject of tic douloureux, I prefer transcribing the note of a clinical lecture.

Clinical Lecture on Tic Douloureux, delivered at the Middlesex Hospital.

"Before leaving this hospital, I mean to give you some clinical remarks; a practice which I have pursued for one-and-twenty

years : it was my earliest duty, and it shall be my last, to the pupils of this hospital.

"There is an indescribable pleasure in reflecting on the successful treatment of diseases attended with pain amounting to agony. On Thursday last re-appeared a patient (Charles Delafield,) in whom some of you were much interested during the early part of last summer. He presented himself a miserable object ; his head surrounded with a night-cap and rolls of flannel, which almost hid a face, pale, and wasted with incessant pain. Seeing him so proper an object for the charity, I gave him a letter, and wished him to come into the house. He expressed himself grateful, but he dared not ; for he could not bear the restraint even of lying in bed, and had no relief from pain but in continual work in his business, which was that of a carpenter. His complaint was *tic douloureux*, and of that most severe kind which fixes in the centre of the cheek : it came like a flash of lightning upon him. I exhausted my little store of remedies, and still he returned, not weekly, but daily, a miserable object—a study for the painter, if he desired to design 'the last man,'—a man despairing.

'After some weeks of attendance, one morning (whilst I was surrounded by the out-patients) this man, not waiting his turn, burst through the crowd, calling out he was cured ! This, no doubt, he did from his confidence in the interest young and old had taken in his sufferings. I knew not what I had given him, but looking at his card, I found the following :—

R. Ol. Tiglii (Croton) gtt. j ; Mas. pil. colocynth. co. ʒj. Misc. et fiant. pil. xii. Mitte pil. galban. comp. xii. One of the purgative pills and two of the gum pills to be taken on going to bed.

"The pills operated quickly, and rather violently, upon him ; but he continued them, the pain leaving him, and a remarkable change taking place for the better in his countenance, no doubt from his obtaining sleep as well as freedom from pain.

"Before I go further, I shall recall your attention to the pathology of this complaint, and venture to repeat what I formerly stated to you. It has appeared to me surprising that authors have omitted to found on the anatomy of the nerves, which leads us directly to the satisfactory explanation of the symptoms in this disease. The sympathetic nerve we have seen to be a whole system of nerves, spreading every where, possessed neither of sensibility nor power over the voluntary muscles ; it is nevertheless acknowledged to have important offices in controlling and combining the whole economy of the system, and to have its centre in the abdominal viscera. The very circumstance of its affording no phenomena like other nerves, should lead us to conjecture that, as this system resembles in structure the nerves of sensibility and motion, it must have powerful, though secret, influences.

"I was careful to point out to you, that the connections of this system, or (if you will) of this nerve, are universal ; but that the habit or mode of demonstrating it leads us to pay more attention to

the branches which extend into the head, though neither larger, nor probably more important, than those which extend into the plexus of the axilla, or into the sacro-ischiatic nerve.

"Are we to admit or to deny this influence of deranged bowels—of visceral irritation—in producing external pains, local paralysis, or partial spasms? No man who attends to disease can deny the existence of this influence. Taking this as admitted, the line of connection is clearly laid down in the anatomy.

"Nor can we deny, I think, the effect of the confluence and mixing of internal nerves with such as go to parts external and exquisitely sensible; and that, through this connection, external pains become significant of internal disease, or more commonly of irritation and disordered function.

"One step further in this inquiry. The fifth nerve is the most exquisitely sensitive of all the nerves of the frame: the sensibilities it bestows are enjoyed in a higher degree than those produced through any other nerve of the system. It is also the seat of most severe pain.

"Impressed with these facts, the moment that we see the map of the relations of the sympathetic nerve with the second division of the fifth, by a large and direct branch, and lesser connections of the same nerve with all the branches of the fifth, we surely need look no farther in explanation of the frequent and intimate dependence of a painful affection of the face upon the state of the digestive organs.

"It is rather remarkable that Mr. Abernethy, who did so much to direct the attention of the profession to the influence of the stomach and bowels on local affections, should have abandoned his ground on the occasion of the triumph of the principle. I allude to that passage of his work where he writes, 'I shall only say, that to me *tic douloureux* appears, in general, to be as much a constitutional affection as gout or rheumatism; and that constitutional treatment is that which seems most likely to be of advantage in this as well as in nervous affections generally.'

"Most certainly the mere exhibition of blue pill and the bitter draught (though they will alleviate) will not cure the painful affection of the great nerve of the face. But consider the length of the intestinal canal; above all, consider how strangely distinct portions of that canal are affected by different medicines. Does not this imply a distinction in portions of the tube, which may, in their disturbed condition, affect remote parts, and with various effects? This, I confess, has long been my opinion; and that, although the common means of relieving a headach, or a megrim or clavus, may fail in this, yet that we ought not to despair of finding a purgative which, peculiar in properties and effects, may reach the seat of this irritation, and may consequently influence the *tic douloureux*; and what more likely than the croton, in proper combination? I was acting under this conviction when I prescribed the croton oil.

"But let us return to the result of experience. Since the period

when Delafield appeared suddenly among us, like him who drew Priam's curtain, I have had four cases of pure *tic*, cured by the same means."]

Since writing the above, every true case of *tic* which has presented to me has been cured.

And now, with regard to the operation for *tic* in the fifth nerve, I hope we may hear no more of dividing nerves to cure neuralgic pains. It was at no time a rational proceeding, and these cases prove clearly that the seat of the irritation is in the nerves of the viscera.

[Yet surgeons, like all men after a certain age, are slow to yield to a new practice, nor will you be certain of propitiating them by proving that they have been wrong; so, some will not only cut the fifth pair, but with a manly determination they will cut the seventh, although distortion of the face, and even blindness, should be the consequence!]

Sir Henry Hallford has stated that the *tic douloureux* in the face arises from the irritation of nerves occasioned by the carious bone through which they pass; and Sir Benjamin Brodie backs him in saying he has seen cases which support his opinion. This is confounding two conditions of the nerve totally distinct,—the nerve irritated by disease in its course, with the remote and circuitous influence which produces the true neuralgic pain. I have stated that the first is always attended with more or less permanent insensibility in the extremity of the nerve, the consequence of the actual disease of the trunk; the other is attended with intervals not only of ease, but of a perfect condition as to sense and motion. In the former, you do no good by remedies directed to the intestinal canal. It is in the latter that they are all-powerful.

Although I restrict myself to the surgical treatment of the nerves, or to such views *as may prevent improper surgical interference*; yet I must state an opinion on a subject of some importance in the medical treatment of these diseases. Whenever a pain returns periodically, the practitioner has recourse to bark and arsenic. Now there are two sources of periodical returns of disease of very different natures. The one is the external influence called atmospheric, the same which produces intermittents; the other is occasioned by a change altogether internal; the condition of the digestive and assimilating processes.—Irritation from the matters passing through the canal in a certain stage of their progress, will be attended with remote pains; and these consequently have a period of return.]

CHAPTER XXIX.

OF WOUNDS OF THE GREAT CAVITIES, THE ABDOMEN AND THORAX.

§ I. WOUNDS OF THE ABDOMEN.

The importance of the subject authorises us in making a distinct chapter of the wounds of the great cavities. You look to the first principles, under the general title of Wounds, page 26, and of Hemorrhage, p. 30. But there is much in the present section which deserves a distinct consideration.

After a battle, the number of men found struck in the belly is in the proportion of its area to the rest of the body. But a few days thereafter you will find there are none, or at least very few, so wounded. The conclusion is too obvious; wounds of the abdomen are the most fatal of all!

Contusions on the belly are often fatal, and sometimes suddenly so. A blow on the stomach, like the *coup de grace*, will destroy life on the instant.

[A bruiser stands up to his antagonist, firmly braced, the muscles of the abdomen in action, and the viscera supported; he will stand severe blows: but when a drunken idiot is found fighting, he may be killed by a single blow. So a man falling from a height, his stomach striking against a projecting part, (a lamp-iron, for example,) is found dead without apparent injury.]

This is a nervous influence, but there is another source of injury and death, the bursting of the solid viscera. By a fall or a blow on the side, the liver is sometimes rent across, and the blood poured out into the cavity of the abdomen; the person dies of hemorrhage. (See symptoms of hemorrhage, p. 30.)

[When Sir Francis Burdett was a patriot, and had the mob at his heels, a young man was shot by a ball from a dragoon's pistol—shot in the thorax, a rib being broken. I saw he was dying of internal bleeding. The feeble pulse—the marble paleness—the gasping and anxious breathing—the restlessness and jactitation—implied approaching death before inflammatory reaction could account for symptoms. On feeling the abdomen, it was tumid, and obviously contained fluid. This youth died, and on examining the abdomen, I found it full of blood. The spleen was burst. In the thorax I found the ball. It had struck the diaphragm without penetrating it, and with such force as to burst the spleen.]

We have understood the nature of a *penetrating wound*,—here, it is where the weapon has penetrated the peritoneum, and broken up the continuity of that membrane. When inflammation takes place on such a surface, it spreads by “continuous sympathy;” and the extent of the inflammation, as well as the importance of the viscera which it involves, are the sources of danger: then, there is

tension of the belly, tenderness on pressure, pain, restlessness, vomiting, and the pulse small and rapid.

[Mark then the difference of the suffering from inflammation, as distinguished from spasmodic pain. In the first, the patient lies supine and motionless, for rising and turning, cause the abdominal muscles to press the inflamed parts, and the pain is consequently aggravated by vomiting—his breathing, too, is high—he substitutes the action of the thorax for the abdominal muscles. In the latter, he twists and turns, and presses his belly, to relieve the pain.]

It surprises and gratifies the practitioner when, contrary to his fears, no symptom arises; this is owing to the adhesion of the surfaces. The term cavity, as every student knows, is incorrect; every thing in the abdomen is pressed into close contact, and when coagulable lymph is thrown out, the surfaces adhere, and thus “the adhesion terminates the inflammation,” it spreads no further.

When the person survives a wound of the belly, we may surmise that the intestines have escaped; for, in fact, by their yielding, they do marvellously escape; or again, the adhesive inflammation has glued together the adjoining surfaces, and the inflammation is prevented from spreading.

Escape of viscera.—When the wound is large, the general pressure and action of the abdominal muscles cause some parts to protrude, and most commonly it is the omentum and a turn of the intestine. This is a formidable occurrence. The *omentum* is unlike what the operating surgeon is familiar with in cases of hernia; there is no condensation or agglutination of the mass. It is delicate, and unless great care be taken, it is torn, and bleeds among the fingers in the attempt to reduce it. The intestine, too, must be handled with great care (and with all the precautions noticed in page 232).

It is ingeniously said by Heister, that when a portion of the intestine has escaped, and is strongly distended with flatus, that a little more should be drawn out, which will render the distention less, and the reduction more easy. I do not exactly perceive this consequence; since you must draw out the mesentery, thereby increasing the volume of the parts. Let it be only understood that the flatus is to be pressed inwards before the reduction of the intestine is attempted. *Paræus* and others recommend the puncturing the intestine with a needle to permit the flatus to escape. This is not to be imitated; on the contrary, the wound in the abdominal walls is rather to be enlarged. The advice shows how much, in their opinion, the flatulent distention hinders the reduction.

[In reducing the parts, have a distinct recollection of the layers of which the walls or parietes of the abdomen consist. You may get the intestine within the integuments, and not within the tendinous sheath of the external oblique; or it may be within the muscles, and not within the peritoneum. Then an obscure fulness,

though no distinct tumour presents, and symptoms of strangulation come on. Take care, then, that the parts are actually reduced, and within the peritoneal covering.]

When the belly is opened largely, the quilled suture is recommended. The reason of this is, that the action of coughing, sneezing, vomiting, causes such an impulse, that the common ligatures cut the skin. The quilled suture has a firmer hold.

[For this purpose, use a common curved needle, with a ligature of four waxed threads; pass the needle through the integuments and muscles; cut off the needle. Do the same at the distance of three fourths of an inch; again a third, and perhaps a fourth. Divide each ligature where it hangs out, into two; lay a bougie parallel to the lips of the wound, and between the ends of the ligature; tie these ends over the bougie. Do the same by placing a bougie between the ligature on the other side—tie—draw the ligatures. The effect is to draw the lips of the wound together; the bougie bearing on the skin, instead of the sharp cutting ligature. Adhesive straps may be used in addition, to adjust the edge of the wound; or the ligatures which tie down the bougies may be crossed over and tied.]

When the intestine is punctured as well as exposed, there is an eversion of the mucous membrane of the intestine through the wound of the peritoneal coat. This in some degree closes the opening, and prevents the evacuation of the contents of the gut; but it also prevents adhesions, for the mucous membrane is not prone to adhesions.

[In the event of the intestine being punctured or slightly wounded, you should transfix the lips with the tenaculum or needle, and throw a fine thread over, so as to draw together the edges of the wounded peritoneal coat; withdraw the needle or tenaculum, and cutting the ligature short, reduce the intestine. It is probable that such a "suture may give way under the action of the intestine; but if before this occurrence the adhesion of the surrounding parts has taken place, the contents of the gut may be confined.

We must confess, however, that the old advice, that of Heister, for example, was, that small wounds of the intestines should be left to nature. Wounds *calami circiter amplitudinem vix superantia sui neutiquam debent sed naturæ bonitati committi.*]

When the intestine is wounded largely, the contents are evacuated, and death from peritoneal inflammation is the consequence. If the wound has been inflicted in an empty state of the bowels, it is more favourable; since time is given for the omentum and neighbouring viscera to inflame and adhere, so as to form a pouch round the wounded intestine, and so to confine the acrid contents of the intestine. Something will depend on the direction of the wound relative to the gut.

[Mr. Travers' experiments show that the longitudinal wound of the intestine is attended with less eversion of the mucous membrane, and better hopes of cure.]

But the intestine may be pierced, and yet not exposed, and in many cases recovery has taken place; for, as explained by Mr. J. Bell, there is a uniform and universal pressure on the bowels, and if no large quantity of the contents be discharged, the surrounding parts adhere, and their contact supplies the defect of continuity in the coats.

Old authors, such as Heister and Dionis, as well as modern authors, as Mr. Travers, are decidedly adverse to the simple process recommended by Mr. John Bell, when the intestine is hanging out and divided. They are, I imagine, right in this matter.¹

[See an Inquiry into the Process of Nature in repairing Injuries of the Intestines, by B. Travers. Read also Sir A. Cooper on Hernia, part 1.

"The glover's suture," that is, the continuous sewing over and over, appears to be preferred; which indeed is the recommendation of Heister; the ligature, instead of being left hanging out, may be cut close off. I pretend to no practical knowledge of this sewing of the gut.]

Mr. Travers found, in his experiments, that the ligatures used to unite the wound of the intestines, were carried into the intestines. I had very long before had experience of this; for, on endeavouring to noose a portion of the intestines to see how long it might be deprived of circulation, and recover, I found that the dogs and cats survived such operations as would have proved fatal in the human body; that the ligatures were first covered with a layer of coagulable lymph, and in process of time, by ulceration, were received into the cavity of the intestine!

But do not let this familiar talk about sewing the gut blind you to the consequences. Unless an immediate and happy adhesion stops the inflammation, vomiting will follow; and it is a serious matter, if not a fatal sign; for if you cannot allay it, then comes tension of the belly, and painful and difficult respirations and death.

You have little in your power but to bleed; the juvantia of purging and the use of antimonials cannot be had here. The evacuation must only be by clyster, and an effervescing draught with laudanum, is all that can be given by the mouth, and a spoonful of milk with lime-water, must be all the sustenance.

The successful cases are principally those of wounds of the colon. Not unfrequently the colon is wounded in the iliac regions, without the peritoneum being pierced.

Anus contre-nature,—I use the French term, because employed by the earliest and best authors.² "Artificial anus" is hardly the

¹ My ingenious brother was severe in those days upon his namesake. Yet the practical rule, as deduced from the experiments of Mr. Travers, and the practice of Sir Astley Cooper, comes much nearer the advice of Mr. Benjamin Bell than of his critic.

² *M. Louis* in the third volume, and *M. Sabatier* in the fifth volume, of the Acad. de Chirurgie.

proper term, inasmuch as more is owing to happy chance than the artifice of the surgeon. "Anus at the groin," see Hernia.

This preternatural anus may be formed in different ways. It has presented to me most frequently, in consequence of inflammation in the colon; which produces, first, adhesion,—then suppuration,—then the abscess opens outwardly,—then the fæces are discharged.

There are sometimes oblique intricate sinuses, and occasional abscesses, which produce distress and fever.

Similar consequences result from wounds, and sometimes the everted mucous coat of the intestines presents; and when the evacuations come, they are attended with an inversion and prolapsus of the gut.

[The last case in which I was consulted was a fistulous opening connected with the colon on the right iliac region. Sir Astley Cooper had preceded me, and advised that the intestines should be locked up for a time with opiates, to give rest to the parts and to the action of the intestine, I must presume, and in the hopes of time being given for adhesion or consolidation. This treatment had not succeeded. My advice was the regular use of small and largely diluted doses of neutral salts, in order to leave no irritating deposit of feculent matter in the colon, and to procure a freer discharge outwardly. I am happy to learn since, that the practice has been successful, under the care of Dr. Scott of Mortlake.

Congestion in the cells of the colon round the nucleus of a bone, produces inflammation and adhesion to the integuments, and an abscess which appears to be superficial, until the undigested matter appears at the ulcer, and declares the nature of the case.

Sabatier, treating of the anus contre-nature, loc. cit. p. 595, says, the matter discharged is not so offensive from not being so long retained, as when it descends through the natural passage. This is hardly the correct view. You know that the stomach, the "intestinum tenue," and the colon, have distinct functions; and "fæcification,"¹ is performed in the great intestines; yet it is better when the communication is formed with the great intestines, for although the discharge is more offensive, it is at more regular periods. Besides, the function of nutrition is accomplished, whereas, when the fistula is higher, there is not only more danger and more distress, from the superior part of the canal being more vital, but the absorption of chyle is diminished, and consequently the nutrition. And here the discharge of intestinal fluid and flatus is almost continual, and the attempt to restrain it attended with great distress.]

Looking to these consequences, they lead to an anxious question. Notwithstanding all that has been said about sewing a portion of prolapsed gut,—is there no surer way of avoiding the imminent danger and the very distressing consequences? I think it would promise better to leave the extremities of a divided intestine which

¹ A word of Abernethy's coining.

had prolapsed, projecting a little from the wound,—adhesion would readily take place between the intestine and peritoneum,—the discharge of intestinal matter would be free,—the danger of its getting into the abdominal cavity altogether removed, and the relief to the distended bowels absolute. As the patient's life is safe when adhesion has taken place, there would remain the operation of establishing the continuity of the canal, which is the operation described under *Hernia*, page 236.

If this operation be contemplated, it should be provided for by retaining the portions of the intestine together. (In the class drawing of the case of *Peltier*, there is half a foot between the orifices, which of course can never be brought together.)

When *the stomach is wounded*, there is faintness and vomiting, and probably vomiting of blood. It is a fatal wound:—when we announce this, we must admit exceptions,—yet they are but exceptions.

Wounds of the solid viscera—wounds of the mesentery—are attended with hemorrhage, and are too often fatal. Bleeding unresistingly into the abdomen, the person bleeds to death, or the collected blood resolving in the cavity, occasions peritoneal inflammation.

[The gall-bladder being wounded, pours out its acrid contents; the bladder of urine being wounded from the abdomen, pours out the urine into the cavity, and fatal inflammation results. Yet have I seen a ball enter under the navel, and lodge in the bladder, and the patient survive. I have had a case where the ball penetrated the bone of the pelvis, and lodged in the bladder.

The principles formerly laid down, will satisfy us how it happens that a musket-ball shall enter the abdomen, and lodge in the colon or bladder. It enters the walls of the distended bladder, because the full bladder resists; but in passing out of the cavity the coats yield, and the ball is thrown back; and thus we explain the not unfrequent occurrence of balls passed by stool after wounds of the abdomen, they having been stopped in the colon.

In the case of gunshot wound of the bladder, you would no doubt keep the catheter in the bladder to prevent the accumulation of urine in it, and the hazard of its escape during the process of sloughing which must ensue. As the operation, as for stone, must eventually be performed, ought it not to be performed the moment that leisure permits? The opening in the lower part of the bladder would allow the urine to flow in that way, and prevent it escaping into the abdomen.

However, the case is not easily ascertained, the symptoms of stone being the first indication of the ball lodging there.

It is possible that the ball lodges in a sac communicating with the bladder and not in its cavity. I have found it so.]

Paracentesis Abdominis.

An operation by the surgeon's hand being still a wound, we may conclude this section with the operation of *paracentesis abdominis*, or tapping. The operation is performed for *ascites* and for *ovarian dropsy*.

When the physician puts his patient with abdominal dropsy into your hands for the operation, you will judge for yourself of its propriety. Have you heard of such an operation as "dry tapping?" It is indeed a serious mistake—for I repeat, it is still a "penetrating wound."

There are present the symptoms of dropsy—thirst, paucity of urine, breathlessness,—there is œdema of the ankles, anasarca of the scrotum, œdema of the cellular membrane of the abdomen. The case is urgent when there is oppression of the chest. In the first place, let it be the endeavour of the practitioner to obtain, by medicine, an increase of urine, for it is when in this state, that relieving the abdomen from pressure has the most beneficial effect.

You examine the patient in different postures: you tap and feel the undulation: you distinguish the tympanitic sound of the flatus in the colon from the fluid in the cavity.

[*The operation.*—You are about to let off a large collection of fluid from the abdomen. Now, although the abdominal muscles and diaphragm adapt themselves to the change of condition of the viscera, yet there is a want of support, and consequently a filling of the abdominal veins, and a faintness consequent on the discharge of fluid. Provide against this by swathing the belly with flannel, and let the assistants hold the ends of the web, and draw tight in proportion as the fluid runs, or when the patient feels low and faint.

In our London hospitals, this is carelessly done by surrounding the belly with a jack towel. But the proper bandage should be used, that it may be finally pinned down after the operation without the necessity of removing the support.]

Take the point most prominent, which will be that intermediate between the umbilicus and pubis. Touch the skin with the point of the lancet, so that you may not be resisted by the tough skin in introducing the trochar. Your assistant having oiled the trochar (consisting of the stilette with its caula) hands it to you. You calculate the thickness of the walls of the abdomen; the depth to which the point should penetrate: you fix your fore-finger on the instrument, at the point which is to interrupt its further progress. Placing the point in the cut already made, you enter it with a rapid motion, more fitted to penetrate the peritoneum than to push it before the instrument. When it has entered the cavity, you push forward the caula, and, if all be right, it moves easily off the stilette.

[It is very proper to stop the flow of serum from a greatly dis-

tended belly, and to give time for the accommodation or adjustment of the muscles to the sudden vacuity.

If the stream stops of itself, perhaps the omentum or the intestine has fallen against the end of the canula; you then pass the second or inner canula.

There will be no bleeding if the puncture be made in the centre of the belly.

If paracentesis should be done in the old place, midway between the umbilicus and the anterior process of the ilium, there may be blood. Should this occur, the evacuation of fluid should be stopped, and the belly firmly swathed. For a time the canula should be pressed down so as to compress the bleeding vessel. Instead of more desperate measures, did the misfortune occur in my hands, I would pass a small round piece of sponge, firmly tied to a ligature, through the canula; press it out with the probe, so as to make it expand beyond the mouth of the canula, and drawing it back, the mouth of the vessel would be stopped.

But as this might occasion peritoneal inflammation, I would advise you to avoid the possibility by tapping in the linea alba, as practised by Mr. Cline, after he had witnessed the loss of blood by tapping in the side.]

The disadvantage of puncturing in the linea alba is, that the wound does not readily close; and the water dripping away, peritoneal inflammation comes on to close the scene. I have avoided this by a little change in the mode of operating: when you have made the puncture through the integuments, before using the trochar, draw the skin aside. By this means, when the operation is finished, and the instrument withdrawn, the wound is oblique, and it closes without the fluid draining away.

[Somebody has advised to keep the trochar in, and occasionally to draw off the water as from a cistern. I drew off the water of ascites six successive times from a poor student in London. Both relations and doctors got tired of this unprofitable work, and proposed that the *tap* should remain! "Why," said I, "the lad will die; peritoneal inflammation will certainly ensue, and the first stage of it will be his death." They persisted. "Well! there is the canula in, manage it how you will." In three days the patient sunk. You at once perceive how much at variance such a practice is with all that I have delivered at lecture. But so it is at the present time; there is no head to the profession to guide it in great doctrines! And schools are numerous over the country, with no acknowledged general principles, nor any sort of bond or affinity.]

In the encysted or ovarian dropsy, there is less fear of immediate bad consequences; the sac has risen and adhered to the peritoneum. It is thick; the contained fluid is gelatinous or ropy; and for these reasons you use a larger trochar.

[☞ You inquire into the history; you find the woman has been irregular, and the uterine functions disturbed. The swelling you

find was first on one side. It extended to the centre; it is of late a general fullness.

The sac has now come into contact with the whole surface of the peritoneum, as it lines the abdominal muscles. It has pushed back the viscera: it has pressed down the uterus: it presses also on the bladder. You may feel the undulation in the vagina, when the belly is tapped, with the finger. You have considered the question of pregnancy.

The operation is the same as for ascites. Sometimes the contents flow freely, and stop suddenly before the tumour is much diminished. Then probably the fluid is in distinct cells. On this occurrence there comes to be a question, whether or not you should reintroduce the stilette, and open another compartment? You must not proceed far in this way, or you will have inflammation. Desist for the present, and gain time; the nature of the fluid may change.

I had a colleague that resolved on a radical cure of ovarian dropsy, for which purpose he left a bougie in the sac. Inflammation followed, and the patient died, as might have been anticipated.

§ II. WOUNDS OF THE THORAX.

Study the forms of the thorax, the relations of the cavities. Observe how narrow the cavities are upwards,—how they expand below,—how far the diaphragm rises, and its form, *e. g.* a sword or bayonet may pass twice through the thorax, and also through the abdomen! Observe also how the lungs and stomach may be wounded by the same thrust, and the patient expectorate blood, while he also vomits it!

I had a patient who had the sharp prow of a wherry driven into the chest, yet he lived, the lungs having been pushed aside. It was not, however, so remarkable as that case which occurred under the observation of Sir William Blizard, where the shaft of a gig went quite through the chest, the end striking the wall beyond! The singular thing is, that Sir William obtained the dissection of the body some ten years after, and you perceive no vestige of the wound. The shaft had entered between the ribs of one side, passed behind the sternum, and pushed back the pericardium and heart. The preparation is in the Museum of the College of Surgeons of London.]

In a penetrating wound of the thorax, the intercostal artery may be wounded and pouring out its blood. You have the symptoms of hemorrhage joined to those of oppression in the chest.

[Various instruments have been contrived to compress this artery; they are not forthcoming when wanted, and are only not worse than the proposal of including both rib and artery in a ligature by a plunge of the great needle. The proper mode is to place a fine handkerchief over the wound, and to push it in with your finger, and then to stuff it with charpie. When you have thus made a

ball just within the lips of the wound, you draw upon it, so that the distended bag, like a compress, presses on the artery, prevents bleeding into the cavity, and may be made to suppress the hemorrhage altogether. When it is required, you pick out the loose lint, and the cloth is withdrawn.]

Of *wounds of the lungs* we may put aside the fatal cases, and direct our attention to those in which art is available.

There is coldness, faintness, extraordinary thirst, oppression, heaving of the chest, tossing of the arms; the mouth fills with blood, and he faints or is suffocated.

In a lesser degree, and in less desperate circumstances attending sword or bayonet wounds, there is frothy expectoration, probably the escape both of blood and air from the wound. He has difficulty of lying on the opposite side, sits up and breathes with difficulty, and with a characteristic twist in the act of inspiration.

[These being the symptoms, what has actually taken place? Obviously the lungs are touched, and the blood is flowing into the bronchi and into the trachea. (There is then danger that it may be drawn into the division of the opposite side.)

The lungs have in part collapsed,—a happy circumstance, for if distended, they would bleed more. Air has been admitted into the lateral cavity of the chest.

The well educated practitioner does not say that the lungs are wounded, because there is a blast of air from the wound in the side. If the wound be large and not oblique, as the thorax expands, the air is drawn in by the wound; and in expiration, that is, the descent of the ribs, that air is expelled.]

Practice.—You use the lancet and bleed as much as is consistent with life; for you have no other means of suppressing internal hemorrhage. You introduce your finger into the wound, and give passage to the blood and air, which gives instant relief.

[How should anything so apparently unnatural afford relief? By evacuating the contained fluid, you do nothing to relieve the side wounded, but you give freedom to the lungs of the other side. The air and blood of the wounded side has compressed the lungs, pressed down the diaphragm, and bears more or less against the mediastinum, which embarrasses the motion of the diaphragm, and the play of the ribs of the other side.

And this is also the reason why the patient cannot lie on the opposite side, since the pressure against the ribs interrupts their motion, on which the act of respiration now solely depends.]

It is obvious why we must reject the contrivances for pumping out the air from the cavity, whilst there is danger of returning hemorrhage from the lungs, or into their cells; and when it is desirable to get the air from the cavity, there is no occasion for instruments to suck it out.

If the patient fully expels the air from the wound by expiration, and you put down your dressing over it, when the breath is drawn, as the air cannot enter by the wound, the expansion of the chest

dilates the lungs to a degree, and if, again, the dressings are lifted as he expires, and closed on the wound when he inspires, more and more air will be discharged; the lungs will come in contact with the pleura costalis, and adhere, after which the remaining portion of air will be absorbed.

Wounds of the Diaphragm.

Formidable as this wound is, the wounded man sometimes escapes with life. A pistol-ball raking across the diaphragm will produce the most alarming convulsions of the muscles which elevate the shoulders. If the duellist does not fall on receiving a shot across his chest, the shoulders will be alternately raised and depressed with sudden jerks. It does surprise us that a shot so deadly aimed does not prove immediately fatal, seeing the closeness of the parts to the diaphragm, the stomach, and liver, below, and the heart above; but so it has happened, and may again. We are reminded of these chances, that we may not at any time be negligent through despair. In the case of such a wound the lancet must be used freely; and still as the oppression returns you must have recourse to it again and again, until it shall become a question whether the patient is to die by the hands of his enemy or his friend—by inflammation and effusion, or the direct debility of over bleeding.

Hernia Pulmonum.

It has puzzled many to see the lungs protruding through a wound between the ribs. They conceive it to be a proof of a power of expansion in the lungs themselves. It is far otherwise. It takes place thus. The wound (probably that by a sword) lets in air to the cavity of the chest, and the lungs consequently collapse. The collapsed lungs, if loose in the cavity, may fall against the wound in the side, whilst yet the cavity contains air. When the ribs descend in expiration, this air finds no exit; and the lungs lying like a valve against the wound, are pushed out. In this we see that the lungs are passive, as they always are.

If this hernia or protrusion of the lungs is to be reduced, it must be by passing a catheter or tube by their side into the cavity, and thus letting the confined air escape, after which the lungs are reducible.

But the portion of the lungs thus thrust out may adhere, and even be strangulated.

[We must remember that no appearance in the dead body is so common as adhesion of the lungs to the sides of the cavity,—the adhesion of the pleura pulmonalis to the pleura costalis; and that this adhesion, in the case of a wound, will prevent both collapse and protrusion of the lungs.]

Gunshot Wounds of the Thorax.

As to wounds of the heart and great vessels, I need not fill my page with narratives—they are fatal wounds. You ought to know certainly that they are not always immediately fatal, that there is sometimes a period of suffering. The man falls—is sensible of a mortal wound—faints—revives—has returning sense; on attempting exertion, faints again: and thus it may be even in a wound of the aorta itself.

When the aorta bursts from disease, the man faints, and falls like one struck dead; but he revives, though blanched and livid. He has excruciating pains from the tearing up of the membranes of the chest; and at each successive stage as they give way, he faints: and thus he may pass one or two days.

If there be a wound of the great vessels—the aorta or vena cava, and the blood escapes freely, the victim never draws breath again, nor utters a groan; but if the blood escapes less freely, and, being confined, compresses the bleeding vessels, he may struggle for a time.

Thus a wound of the heart, giving its blood out into the pericardium, the blood surrounding the heart suppresses its action, and the weakened action at the centre of the circulation sometimes saves him from immediate death. There is a case recorded of a sentinel aboard a ship falling down a hatchway; his firelock fell more rapidly, the body fell against the bayonet, which transfixed the heart; the man survived to the third day. We have even gunshot wounds of the heart recorded, where men have survived many days. But this is idle gossip; these wounds of the heart and great vessels are fatal.

I have myself observed one curious circumstance in regard to gunshot wounds of the heart, that, in one case, a ball will simply pierce it, whilst in another instance a small bullet shot from a pocket pistol will make a wound from the base to the apex. I imagine that this depends on the state of systole or diastole, in which the heart is, at the time the bullet strikes it. There is a preparation in the College of Surgeons Museum here, the heart of a man who was assassinated in the neighbourhood of London; a small bullet passed through the heart. Upon examining the body, I found a rent in the muscular substance of the ventricle, which would admit my five fingers. It may be a question whether this takes place during dilatation of the heart, or during its contraction. In such a case the death must be instantaneous.

In conclusion, on looking to these desperate wounds in the cavities of the trunk, the surgeon's offices are very limited, but very important. They require great decision in the use of the lancet; and the patient should be raised, and the orifice made large, in order to induce deliquium; for this state of faintness not only gives time for the coagulation of the blood in the vessels, but in a remarkable manner checks the rising inflammation. For the rest, you

must appear cruel to be kind; water must be food and drink; he must be kept cold and chilly, and far better lie by a dike side, than to have all the comforts and attentions of his home, and sorrowing friends.

From what has been said, p. 40 and 45, on the track of a bullet, we may form an accurate notion of its effects in passing through the lungs. The ball may be so checked in its velocity that, after breaking a rib, or passing the intercostal spaces, it may drop into the cavity, striking the yielding lungs without penetrating them.

If the lungs are perforated, the danger will be imminent when the ball has passed near the roots of the lungs, less so, if it has only passed through the margin. In the former case, he will be in danger of suffocation from blood.

If a man dies from a shot through the lungs before there is time for reaction, his condition is this: the lungs are dark with coagulated blood; the cells are condensed and full of blood; there is blood in the cavity of the chest, and in the bronchi and trachea.

If he lives eight days the lungs are not only solid through extravasation of blood, but condensed by inflammatory exudation—hepatised, and with the appearance of mortification. The cavity is filled with serum. On raising the body to the table for examination, it sounds like a half empty cask.

If a man has survived a wound through the lungs, and an opportunity is afforded of examining the condition of the thorax at a remote period, we find the cavity of the thorax on the side wounded, diminished of its natural dimensions, by the diaphragm having risen and adhered to the pleura and ribs; the lungs diminished in size, condensed in their substance, and universally adherent by a layer of organised coagulable lymph which lines the chest.

The symptoms of a wound of the lungs are obvious from these statements. The patient feels that flutter and nervous depression which attend the injury of a vital organ: he breathes high, with bloody foam at his mouth; his cheeks and lips are livid, with tossing of the arms, and anxiety; the blood rattling in his throat is drawn inwards, and into the bronchi of the opposite side, and he dies suffocated. If he survive for a few days his suffering is extreme, and he dies from extravasation of fluid impeding the breathing, and from inflammatory exudation succeeding to the extravasation of blood.

From this statement we perceive what is the duty of the surgeon; to bleed, to see that the symptoms are not aggravated by blood or serum, and perhaps broken ribs in the cavity of the chest. In that case, he enlarges the wound, or it may be necessary to open the thorax at the point of election.

Paracentesis Thoracis.

[The *point of election* is a phrase. To open into the lateral cavity of the chest, you make an incision along the upper edge of the

seventh rib : you divide the intercostal muscles ; expose the pleura ; open it with the lancet, and enlarge the wound as there may be occasion.

It is well not to make the incision direct ; that is to say, you make the incision of the integuments lower than the edge of the rib, and turn them up to cut through the intercostal muscles. By this means you obtain a valvular flap, which you can, if necessary, close down or keep open as there may be occasion.

But remember what is here said ; the side of the thorax may be distended, as in the case of empyema. But after a time the matter may have been absorbed, or more likely expectorated ; then the diaphragm rises, and is adherent to this point, where you are directed to make your incision.

The paracentesis may be necessary for empyema. Heister, Garengot, &c. will tell you that the patient cannot lie on the opposite side, because the matter in that case presses on the heart and lungs ! This is not the case, and the reason above stated is correct. The difficulty of reclining on the opposite side is proof of the presence of matter. Percussion will enable you to decide.]

Trepanning the Sternum.

As Petit, Heister, Hoffman, and others, treat of trepanning the sternum, it may become a question. As to its "being more safe than trepanning the skull," it is the expression of ignorance. What analogy is there between the cases ? Petit speaks of the tabula externa and interna of the sternum. The sternum is a spongy bone with a thin shell of bone externally. It is owing to this spongy structure that, like all similar bones, it is subject to scrofulous caries. Then, indeed, matter may form under it. But the condition of that matter is widely different from pus under the skull. I have known a musket-ball strike the sternum so as to produce exfoliation of its whole substance ; and cases may occur, like those described by Petit, vol. i. p. 80, in which the bone should be perforated to give issue to the pus, or it may be necessary to take the carious portion of bone away. But recollect, if you trepan here, so as to divide the bone into an upper and lower portion, or if you weaken it so that the connection is afterwards broken, that as the lower portion of the sternum moves, in breathing, through a larger space than the upper, you will have an attrition taking place between the surfaces, attended with incessant irritation, unless the chest be swathed so as to limit its motion ; unless, as in the case of fracture, you substitute a more free action of the diaphragm and abdominal muscles for the motion of the chest.

CHAPTER XXX.

OF WOUNDS IN THE NECK AND THROAT.¹

Sword wounds in the neck and throat are full of danger, from the risk of dividing the carotid or its branches, or the internal jugular vein. A wound under the angle of the jaw is difficult to manage; a sponge for a time may stop the formidable bleeding, but the irritability of the glottis prevents you from using a compress and bandage, and the vessels must be secured by ligature; it is difficult to see the bleeding orifice, the cavity fills so rapidly with blood. You dare not dive into such a part with the needle. For these reasons, it is often necessary to tie the carotid artery. But in these cases, I have advised a middle course: make a cut, as in the operation of tying the carotid; go through the integuments and platysma, then with the finger and thumb seize and compress the carotid; now sponge out the wound, and as you relax your hold of the carotid there is a jet; you see the spot; in the instant the blood is stopt, and you can raise the bleeding vessel on the tenaculum; if this should fail, you must proceed with the operation of laying bare and tying the carotid artery itself.

There is an important remark regarding the wound of veins lower in the neck, and above the clavicle. It is familiarly known that a little air let into the circulating tide of blood, kills in an instant. I had the advantage of a long and interesting conversation with Baron Larrey on this subject, and he gave me several instances in which his patients wounded in the neck had suddenly expired. There is no doubt that air admitted into the veins of the neck is the cause of the sudden loss of life.

[As to the manner in which the air enters, there have been very formal and philosophical discussions, altogether unnecessary. It is long since I explained the use of the great sinuses of the jugular, the raising of the platysma myoides and sterno-cleido-mastoideus in respiration, and the means afforded by the alternate rising and falling of these muscles, and the clavicle, of relieving the circulation of the head. It is in this act of inspiration by which the veins are filled that the air is drawn in.]

At all events, it is important to notice, that in all operations where these veins are opened, you should guard against the entrance of air into them.

When he who aims at self-destruction fires a pistol into his mouth, the bullet very often goes aside without penetrating to the brain, but he dies from the powder and not the ball! For the grains unexploded driven into the fauces cause inflammation and suffocation. But if, in such a case, the trachea be opened, he may

¹ The subject may be considered as continued from p. 151.

be saved from suffocation. This, however, is not enough, he must be fed through a tube.

In gunshot wounds of the neck and throat, your attention will be required to the irritation of the glottis, as suffocation may come on from the rising of the inflammation, and the operation of laryngotomy may be necessary; the œsophagus may be also wounded, in which case the patient must be fed by a tube. I have seen a man starving from this wound, who might have been saved, had there not been hundreds calling for assistance, and an utter inability to afford him that continual attention which his case required. I advised a tube to be introduced from the wound into the stomach, but I know not if it was complied with. I thought it might have been kept in, and the man fed, until time and opportunity was given to pass a tube from the mouth or nostril, so that reunion might be permitted, and the œsophagus made once more continuous.

When the suicide inflicts a wound upon himself, he in no sense knows what he is about. He means to kill himself by opening the windpipe; the os hyoides often protects the vital parts,—oftener still the thyroid cartilage. If the knife has reached the carotid, the deed will in all probability be accomplished. The hemorrhage is generally from the thyroid artery.

[My predecessor in the Middlesex Hospital being under the hands of the barber, they began to talk of an attempt at suicide in the neighbourhood; on which the hospital surgeon called the wretched man a fool, and told the barber how he should have done it. The unfortunate barber retired into the back area, and cut his throat: there was no saving him! Take a hint from this melancholy fact.

Be under no delicacy in ordering the straight-jacket; although the miserable man has generally the notion of destroying himself in one way only, yet it is not always so, and if he leaps the window or poisons himself, you must be accounted remiss.]

The first object is to secure the bleeding arteries. When this is done he is so far safe; but if the knife has opened the larynx, and cut the arytenoid cartilages, he will die notwithstanding from the irritation. If the cut has been made in the trachea, he may fare better.

I hope you will find it possible to use the needle and the ligature to unite the divided tube, without transfixing the rings of the windpipe, which ought not to be done. Nor is it proper to unite the wound of the integuments closely: the irritation of the wound produces violent coughing, which bursts up the ligatures; and if they hold, so much the worse. A stitch at the sides of the neck, or extremities of the wound, is enough, leaving an aperture in front to permit the air and mucus to escape, when he is seized with a fit of coughing or suffocation.

The double-headed roller is put round the head, stitched at the temples, and brought down and fixed to a circular bandage round

the body. By this means the head is inclined forward, and the lips of the wound kept in contact.

They die from one of two causes,—the excessive loss of blood, or from the inflammation and irritation of the air-passages.

Of the Wry-Neck.

In the old books, there is nothing intelligible on this subject. Heister makes as regular a chapter as if he had information to convey, and refers to *Tulpius*, *Meikren*, and *Roonhuys*.

[The affection arises from a morbid condition of the *sterno-cleido-mastoideus muscle*, and this muscle is especially exposed to disorder as a muscle of respiration, through which the spinal accessory nerve passes.—See Bell on the Nervous System, 8vo, Appendix, p. 414.

The spasmodic affection of this muscle is very frequent; by a succession of impulses the head is drawn to the shoulder, and the chin pitched up. Sometimes both muscles are affected, and the head is turned alternately from side to side, like the head of a Mandarin image.]

These are interesting cases, but cannot be treated here. I have given cases in detail, *loc. cit.*

The muscle is subject to a diseased degeneration of a different kind altogether. It becomes ligamentous and like a cord, which checks the motions of the head, and holds it down to one side, with a twist and elevation of the chin. When this is permitted to continue, the vertebræ of the neck are directed in their growth, and a curvature is the consequence.

At an early period, I think this complaint may be remedied by shampooing the muscle, and stretching the head and neck in an opposite direction; but if this does not succeed, you should proceed to the *operation of dividing the cord*. Supposing it to be the sternal portion of the muscle which has thus degenerated, and the patient is a girl, you may pass the sharp-pointed bistoury under the origin, and close to the sternum, and cut towards you. An assistant twists round the head, so as to put the tendon on the stretch.

Or you may divide the muscle higher in the neck. Mark and avoid the external jugular vein; make a small incision by the side of the muscle, and in the same direction with it; into this incision insinuate the straight sharp bistoury, in the direction across the muscle, and pressing it down on the stretched cord, you will hear it rend and give way.

A collar round the neck, and a bandage round the head, are proper aids after the operation to keep the head in position, and the ends of the divided muscle apart. When the head is so held up, the incision through the integuments will be closed, which is the intention of making it in the length of the muscle.

CHAPTER XXXI.

OF THE DISEASES OF THE EYE, AND THE OPERATIONS PERFORMED ON THE EYE.

The morbid conditions of the eye make a subdivision of great extent and interest. To the physician it is of the first importance, while the surgeon's judgment and most delicate attention are required in this department.

Nervous Affections of the Eye.

Not only the optic nerve and retina, but the nerves and muscles in the orbit, are susceptible of impression, and become disordered in sympathy with visceral derangement.

Ptoſis is a falling of the upper eyelid. Mark the dropping of the eyelid from debility of the *attollens* muscle, as distinguished from disease of the eyelid itself. The eyelid is sometimes thickened and immovable from inflammation. The growth of the integument is sometimes so great as to require a portion to be cut away.

[For the falling of both eyelids in the nervous or hysterical constitution, see Appendix to the Nervous System, p. 375.]

When the eyelid is fallen, apparently from an affection of the branch of the third pair which supplies the *attollens palpebræ superioris*, you are desirous of knowing how far the other nerves are affected. For this purpose, you raise the eyelid, and make the patient move the eyeball in all directions. You touch the eyeball, and ascertain that there is no defect of sensibility. If the motions of the ball be lost, and the sensibility of the surface, it is implied that there is pressure on the nerves, or disease of the brain, and into that you inquire. The indication is more unfavourable if the pupil be dilated and the vision obscured.

If there be no other function lost besides the motion of the lid, it may be a rheumatic affection of the muscle itself.

A twitching of the eyelids often proceeds from watching and fatigue. In morbid nictitation, you first see that there is no cause of irritation in the eye. It is probably a degree of affection of the *portio dura* of the seventh nerve.

[Break the habit ere it become fixed. Foment with opium in the lotion of aqua ammoniæ acetata. Apply the opium plaster to the temple, and gentle pressure in the course of the nerve. Be attentive to the state of the stomach.]

Anæsthesia of the surfaces of the eye (*i. e.* insensibility).—This is very alarming when you find the whole extent of the distribution of the ophthalmic division of the fifth nerve similarly deficient in sensation. You look anxiously to the state of the nerves of motion—fearing that they may be affected—implying that they are all compressed or involved in disease.

But happily the anæsthesia is often temporary—often like the amaurotic condition of the retina—and depending on deranged visceral functions.

Oculus leporinus, Vne de lièvre.—Authors improperly class this state with strabismus. It is an affection of the *portio dura*, and consequent defect of the orbicularis muscle. It attends the paralysis of the portio dura, from whatever cause arising.

[You will notice that, in this condition of the eyelids, the eyeball is pushed considerably forwards, in consequence of the want of support or of compression of the eyelids, which adds to the startled look, and has suggested the name of hare-eye. (See Diseases of the Portio Dura, *loc. cit.*)]

Nystagmus.—I give it an old name, for it is a curious phenomenon. It is an incessant motion of the eyeball. Dr. Bright considers it a symptom of cerebral pressure. I have seen it an attendant on fracture of the skull, and so has Mr. Mackenzie of Glasgow. But yet I find it constant in some individuals; and I have seen it in one half of a large family of children: also in the albino. The remarkable circumstance is, that, whilst the eyeball is thus incessantly in motion, the vision is perfect; objects do not dance before the person. One girl was a sempstress, and could thread her needle while the eye was vibrating. For the explanation of this phenomenon, see the Nervous System, *loc. cit.*

Strabismus, *Squinting*.—The most frequent defect in the eye is a weakness in the abductor muscle. When it is in a certain degree, the person sees double when the eye is in one position. For example, the abductor muscle of the left eye being affected, the patient sees with both eyes when looking to the right, and so he does when he looks straight forwards; but when he turns the eyes towards the left, the abductor of the left cannot contract further; the left eye is fixed, whilst the right moves, and now he sees double, &c. The images are more apart the farther he looks to the left.

When the squint is established, the weak eye is turned inward and upward.

[Distinguish squinting from double vision. You cannot squint at pleasure; you only distort your eyes: when you do, you see double; whereas he who squints sees single. When the patient has an obliquity of vision after fever or in hydrocephalus, he sees double. In the confirmed squint, the person attends to the impression on one eye only; and if you interpose your hand between the weak eye and the object, he is not conscious of the interruptions.

The explanation of these circumstances must be reserved for lecture; and few are disposed, and indeed accustomed, to that process of induction by which the true theory is established.

I shall only say here, that the first stage is in the defect of the abductor of one eye; that it has its origin in repletion and disorder of stomach. I have lived long enough to witness the whole process. I remember the good mother of a family at table watching little master that he did not squint. "Ha! Georgie, you are squinting!"

George was filling his belly. A dose brought the boy right again. But at last the distortion became fixed, and Mr. George is now a proper ugly fellow.

As to the cure of squinting in children, it is obvious that there must be attention to diet. Ipecacuan vomits—warm purgatives—friction to the belly—and tonics. In the after period, it must be your endeavour to strengthen the eye which is weak and distorted, and to bring it into play by closing the other eye—"a system of exercise" with the weak eye; *e. g.* the *gnomon* of Darwin. The subject has interested physicians and philosophers, such as Buffon, Drs. Wollaston and Darwin; but they have wanted the facts on which to reason.]

There is a fixed distortion of the eye. In this case the defect is in the third pair, and the abductor nerve being remote from the cause of pressure, the abductor muscle prevails, and turns the eye outward. In this case a disease within the cranium is to be dreaded.

[*Tic douloureux* in the eye is not uncommon. The subject is treated at length in the Appendix to the Nervous System. I have only to add, that the system of cure stated there has been uniformly successful ever since.]

Anaurosis—*Gutta serena* of the Arabian writers—is an insensibility to light from affection of the optic nerve or of the brain. It is marked by the enlargement of the pupil, and the fixed condition of the iris. The insensibility may occur in all degrees, from that which produces night blindness (*Nyctalopia*) to the complete insensibility to the strongest light.

[See a good case of night blindness by Dr. Pye, *Med. Observ. and Inquir.* vol. i. p. 111. It is the defect of light on the diminished sensibility which causes the blindness on the going down of the sun. But because the defect was periodical, therefore the doctor ordered "that magnum Dei donum"—the bark. See Periodical Recurrence of *Tic*. See Dr. Heberden's Observations on a particular Affection of the Eyes, *Trans. of the College of Physicians*, vol. iv.

Let anaurosis be distinguished from glaucoma, which is an opacity seated behind the pupil.

The defect may be what is sometimes called functional; more properly it depends on the state of the stomach, and is removed by vomits, bitters, and alteratives. Use the veratrine, joined to an ointment, and rubbed on the forehead; blisters: stimulating vapour: as the aqua ammoniæ and sulphuric æther. Electricity and sternutatories are exceptionable.

The subject might lead us to the state of insensibility to certain colours.]

Muscae volitantes.—These are dark spots, which are seen to float and fly before the eyes, but are in truth consequences of an affection of the retina itself. It is easy to prove that the cause of

these are from a fixed imperfection in the web of the nerve, and that they seem to move from the motion of the eye.

[See the paper of the most ingenious physician Dr. Wells.

They are sometimes round and defined; sometimes like filaments; sometimes distinct, and yet transparent. They are sometimes lucid like a drop of dew, and sometimes like a cobweb.

Oculists attribute these spots to the dilatation of the branches of the arteria centralis retinæ. I do not think they result from a change in the circulation within the eye, but from a condition of the nerve, and remotely from affection of stomach. They appear in the debility of fever, probably from another cause.]

Another affection of the retina, arising from the same cause, is an insensibility in some part of the retina. Sometimes one half of the field of vision is obscured. It is temporary, but may become permanent.

[See Dr. Wollaston's case, Phil. Trans. His theory does not hold. This subject, in a philosophical work, would lead us to that of spectral illusions.]

Ophthalmia.

[On this subject you have much to study.¹ The delicacy of structure, and the exposure of the eye, subject it to many influences both external and constitutional. The eye may be destroyed by inflammation in twenty-four hours.]

Inflammation from external influence, as cold and wet.—Of these you have catarrhal ophthalmia, an inflammation of the conjunctiva. There is pain as if of sand in the eye—the vessels are visibly enlarged—the eyelids stick together. It will run into chemosis and suppuration, and at length to ulceration of the cornea.

From the same source comes rheumatic ophthalmia. It is deeper seated in the coats of the eye,—the pain is pulsating and deep; the pain is around the eye as well as in it; it is especially seated above the eyebrows. This inflammation is aggravated at night, and is accompanied with fever.

Oculists make a third species of inflammation, by joining these two. In the catarrhal inflammation, you foment with tepid collyrium, *e. g.* the liquor ammon. acet. extr. opii and distilled water. You drop the solution of the nitrate of silver into the eye.²

[In the deeper rheumatic ophthalmia, you apply leeches and bleed. You have immediate recourse to calomel and opium. You foment before the evening attack. You regard the iris, and if it be threatened, you guard it by smearing the extract of belladonna around

¹ As proved by the extent of the work by Dr. Mackenzie, a volume which combines ingenuity, research, and experience.

² Or, ℞. Hydrarg. oxy muriat. gr. i.
Ammon. muriat. . gr. vi.
Aquæ distil. . ℥viii.
Vin. opii. . . ʒii. fiat Coll.

the eyelid; or use a liniment of belladonna in laudanum. For the rest go to the treatment of rheumatism.]

Strumous inflammation of the eye is the most common of all in young persons. You recognise it, 1. By the sneezing and the watery eye; 2. The redness of the conjunctiva; 3. The intolerance of light; 4. The severe spasms of the eyelids; 5. By the early occurrence of ulcer in the cornea; or of phlyctænæ which run into ulcer, and these countenanced by the constitutional signs of struma.

Treatment.—Purge with calomel and jalap; apply a blister to the back of the neck; drop the vinum opii, and bathe with tepid opiate lotion; take a small painting-brush, wet it, and touch the pencil of nitrate of silver, and then neatly touch the ulcer of the cornea. Pediluvium and Dover's powder.

You must study the subject farther, under the heads of *Ophthalmia of new-born children*, *Gonorrhæal Ophthalmia*, *Egyptian Ophthalmia*. It is from these that we have most to fear the entire and sudden loss of the eye. I have found the injection of the solution of cerussa acetata and opium to be the most effectual in gonorrhæal ophthalmia.

Consequences of inflammation in the eye, and principally of strumous ophthalmia. These are—

Chemosis, which is an inflammatory œdema of the conjunctiva.

Leucoma, which is the cicatrix of the cornea, in consequence of phlyctænæ and ulcer.

Albugo is an effusion of coagulable lymph in the cornea.


Hernia iridis, when the ulcer of the cornea penetrates its whole substance, the aqueous humour escapes, and the iris falls forward into the gap. It closes the gap. Sometimes it projects black like the head of a fly (hence *myocephalon*.)

Onyx is pus within the lamellæ of the cornea.

Hypopium is pus collected in the anterior chamber of the aqueous humour.

We should really conceive that oculists were the most learned members of the profession. They speak nothing but Greek; adhesion of the iris must be called *synechia*. It may adhere to the cornea by falling forwards, or to the capsule of the lens behind.

Lastly, closing of the pupils.

The various degrees of opacity of the cornea from the *pannus* externally to the hypopium or pus behind it, are effects of inflammation, and to be avoided or remedied by subduing inflammation, and in the chronic stage by local applications, *e. g.* the lotion of corrosive sublimate, the lotion of the lunar caustic, the vinum opii, the salve of levigated red precipitate, and the division of the enlarged vessels.  And always remember to turn down the eyelid, and see that a granular state of the conjunctiva is not keeping up the irritation on the cornea.

Effects of inflammation on the Exterior Apparatus of the Eye.

In œdema of the eyelids, you wash with rose water and a little brandy. It is probably from the habit, or a symptom of debility, though it may arise from disease within the orbit.

Ecchymosis under the conjunctiva.—The appearance is formidable. An astringent collyrium may hasten its disappearance.

Ptyrigium, a condition of the adnata, arising from chronic inflammation; it takes the appearance of a superficial membrane, stretching from the inner canthus in a conical form towards the cornea. Its vessels are to be cut across with the scarificator. It may be removed altogether; but the solution of caustic will in time cause it to disappear.

We cannot be surprised to learn that the *caruncula lachrymalis* inflames, and that an abscess is formed by the side of it; and that, by continued irritation, it should rise into a tumour, which is called *encanthis*, and that, like every part subject to tumour, the growth may be malignant.

Epiphora and stillicidium.—The first is a weeping of the eye from excessive secretion of tears. The second a weeping of the eye from obstruction of the lachrymal ducts. The first comes often from wine and wassail. (Order a little bottle of the spirit of camphor and nitric æther, and let him turn it upon his finger, and anoint the upper eyelid from time to time.) The excitement will be relieved by the steam of laudanum. Put a teaspoonful of laudanum in a cup of boiling water, and hold it under the eye. See that an eyelash be not inverted,—there may be some such source of irritation.

[The eyelid of old people is sometimes turned out, and with it the puncta. The tears not being absorbed, they fall over the cheek.]

The meibomean follicles on the margin of the eyelids are affected by chronic inflammation, not unfrequently after small-pox, measles, and scarlatina. The morbid secretion glues the eyelids, and the cilia are pulled out. Various unpleasant effects follow, as obliteration of the ducts, wrong direction of the hairs, contraction or eversion of the margin of the eyelid from ulceration.

Foment with poppies, and use a mild citron ointment. When the margins are ulcerated, touch them with the ointment of *argentum nitratum*.

*Hordeolum, sty*e is a small chronic boil on the margin of the eyelid, with itching and pain. It is to be treated with stimulants, and much attention to the digestion.

The ciliary cartilage may be turned out beyond the action of the ciliaris muscle and lower portion, constituting what is called *ectropium*. If it occur spasmodically, attempt reduction. Failing in this, it will require leeching or scarification and compression; an operation is performed of cutting out a portion of the conjunctiva.

Entropium is the turning in of the eyelid, a most troublesome condition, since the hairs are directed upon the eyeball, so as to produce great irritation.

In these cases, the principle of practice is to produce contraction through the means of cicatrisation; and this is done by caustic or the knife, or sometimes a hot wire. Still these learned oculists will not be satisfied with a simple description of the fact. They must have a learned name for the inversion of the eyelashes, *trichiasis*.

OF THE CATARACT.

The cataract—*gutta opaca*—is a disease of the crystalline humour, by which the humour or its capsule becomes opaque. The opacity comes on gradually, though sometimes quite suddenly.

It varies in consistence; the colour is generally a greyish-white, and then the opacity is in the humour. When of an amber colour, you may suspect it to be hard; if pure white, then fluid; if streaked, capsular.

The symptoms are, indistinct vision,—a cloud or something like gauze before the eye,—he sees worst in a bright light,—the candle is expanded into a globe.

[You take care to distinguish it from *amaurosis*, and from *glaucoma*. The opaque body of the cataract is close to the iris, and accurately limited by its margin. An amaurotic person sees best in a bright light; to him the light of the candle appears spreading in rays. Even early in amaurosis the pupil is large, and the iris fixed, and the eye wanders; whereas, in early cataract, the iris moves freely. Belladonna applied to the amaurotic eye, makes the vision decidedly worse. The veratrine, used as an ointment to the forehead, improves it (in conversation with Alexander.)]

Glaucoma is an affection of the vitreous humour. It produces a greenish hue, reflected from behind the pupil.

[You may have more difficulty in distinguishing the posterior capsular cataract from glaucoma, because it is removed backward from the pupil; but it is streaked with a deep opacity, whilst glaucoma is neither spotted nor streaked. In glaucoma you can sometimes feel a stony hardness in the eyeball.

When you examine your patient with cataract, you set him with his eye obliquely to the light. You cover the other eye. The pupil should be dilated by a drop of the solution of belladonna. You may direct a strong light upon the lens by means of a magnifying glass. You mark especially the condition of the iris, if the margin be regular, and if there be no adhesion.]

The operation of Extraction.

Dexterous operators take no assistance in holding up the eyelids or fixing the eyeball; yet Pellier's wire-speculum is a good instrument. The assistant stands behind the patient with his hand upon

the patient's forehead; he draws back his head upon the pillow, which rests on the high-backed chair (not on the assistant's breast, since that moves in breathing.) If the assistant uses the speculum, it is pressed between the upper eyelid and the margin of the orbit. He rests against the bone, and does not in any degree press the eyeball,—that remains for the operator to do, by the pressure of the points of the fore and middle fingers of his left hand. The operator raises his foot, placing it firmly, so that by resting his elbow on the knee, his hand shall be on a level with his patient's eye.

He dips the point of the knife in oil; he rests the little finger of the right hand on the patient's cheek. He presses down the lower eyelid with the point of the fore-finger of the left hand, the point of the mid-finger pressing the caruncula lachrymalis.

As I am against the vanity of a surgeon pretending to be ambidexter, if the right eye is to be operated on, I advise that the patient should be laid on his back, the head resting firmly on a pillow; and that the surgeon should raise the upper eyelid with the fingers of the left hand.

[It is the purpose of the operator so to pass his knife anterior to the root of the iris, and parallel to that membrane and across the cornea, that, by carrying the knife directly onwards, without a pause, it shall cut itself out, and make the proper incision. Scarpa's knife will do this. But if the breadth of the knife be not equal to half the diameter of the cornea, the aqueous humour must escape before the incision is completed.

The incision is made one-twentieth of an inch from the sclerotic. If properly done, one half of the cornea cut will admit the passage of the cataract.

A common mistake is, not calculating the thickness of the cornea, so that exteriorly the incision takes in full one half of the cornea, and yet, by passing superficially, an imperfect section is made for the evacuation of the cataract. Care is therefore taken, that in entering the knife, it penetrates directly to the aqueous humour.


The upper half of the cornea is divided by modern operators. This is done that the slight opacity made by the cicatrix which follows the incision, shall not interfere with the vision of things below the level of the eye, and that it shall rather be on the part usually covered by the margin of the upper eyelid.]

The *misadventures* in this operation are:—1. The escape of the aqueous humour, and the consequent falling forward of the margin of the iris before the edge of the knife; still, by pressing on the cornea, you may float back the iris, and be enabled to complete the incision. Rubbing the cornea to excite the iris is nonsense. Rubbing the cornea does not excite the iris. If the margin of the iris cannot be withdrawn, the knife must.

2. The eyeball turning in spasmodically to the inner canthus, so that you cannot carry the knife onwards. But a dexterous operator would wait, and by a fine management of the knife he would, in this event, carry back the eyeball to its position; and pressing

the cornea with the point of his finger against the knife, complete the incision.

3. If the edge of the iris should be cut, the cataract is tilted. For as the iris sustains the cataract by the uniformity of its resistance to the protrusion of the disc of that body, now that one side of the iris gives way, the margin of the cataract is projected forwards, and the vitreous humour follows. There is nothing for it in this case but *extracting* the cataract with the hook!

[When the incision by any such accident is imperfect, the probe-pointed knife, after a pause, is introduced, and the cut completed, or the scissors are used for the same purpose.  Always remembering that the whole success of the operation depends on the incision being properly made; properly meaning, of a just size to admit the crystalline humour to escape, and no more.

When the incision is completed, the cataract is retained by the strength of its capsule, and the uniform resistance of the iris. But the slightest touch on the capsule with the point of the knife, or with a needle, causes it at once to tear up, and the cataract starts out. Accordingly, some operators, in passing their knife across the anterior chamber, will dip the point into the pupil, and touch the capsule. Others, in withdrawing the knife, will do the same. The following is better.]

The instant that the knife is carried through, the operator lets down the upper eyelid, and with his fingers over it sustains the eye during the spasm that inevitably attends the operation. Resting for a minute, with the hand covering the eye, he carefully lifts the eyelid; and he finds, when all is right, that the cataract is slipping from under the flap of the cornea.

[You perceive, then, that when the operation is well performed, it is not *extraction*. But that the incision being perfect, the action of the muscles compressing the ball forces forwards the vitreous humour, and before it the lens, and that the operation is rather the *protrusion* of the cataract than the extraction; and I waste time on this distinction, because it leads to an important precaution. You are to guard *against the protrusion of the vitreous humour*, as well as of the lens!]

Look to the right position of the flap of the cornea; see that the eyelashes are not inverted; lay a wet compress on the eyelids, and bind up the whole with slight support. Teach your patient to avoid straining and coughing, and to support the eye in the event of a fit of coughing.

[You look into the eye perhaps on the third day, and all is well. But the inflammation and spasm may invert the eyelid after this, and inflammation and suppuration come on, and the eye is lost. Pay particular attention to the inversion of the eyelid, and to keeping down inflammation.

Operation by piercing the sclerotica.—See the effect of not understanding the theory of the operation, and yielding to a name.

They propose an operation of *extraction* by cutting behind the iris. In such a case they must *extract*. It is not to be thought of.]

Operation to produce absorption of the Lens or Cataract.

[The principle on which the operation is founded is this: that when the capsule of the lens is burst, and the aqueous humour let in upon the substance of the lens, that body is dissolved and absorbed.]

The pupil is dilated by solution of belladonna. The needle is put one twelfth of an inch behind the margin of the iris; the point is brought to present in the centre of the pupil; the capsule is broken through, and the substance of the cataract puddled down, and part of the substance pushed into the anterior chamber.

[*Precautions.*—If you burst up the anterior of the capsule too much, the cataract will start forwards into the anterior chamber. In that case, the operation by cutting the cornea must be performed. (They say such an accident was the occasion of the invention of the operation of extraction.)

When a considerable mass of the cataract lies in contact with the edge of the iris, it excites inflammation in it, and that inflammation will close the pupil.

If extraction should be necessary to take the lens from the anterior chamber, wait no longer than till the iris recovers the influence of the belladonna.]

The operation by absorption is also done by entering the needle through the cornea. In these operations do not attempt too much at once. Repeated touches with the needle may be necessary.

Of Couching.

This operation is supposed to be much easier to perform than extraction. The difference is, that the faults in the manner of the performance are less obvious.

The needle is passed behind the iris, the capsule broken, and the cataract depressed below the line, which the rays of light take to the bottom of the eye.

That there should be inflammation, violent bilious vomiting, and total loss of sight from this operation, is not surprising, if we consider what may be the consequence of awkwardness and violence. For example, is there any thing more frequently seen during this operation, than that the cataract disappears from the pupil, carried down on the point of the needle, and *that it rises again*? What should make it rise? The truth is, that in thus depressing the lens, the vitreous humour is rolled round,—the two humours have not been separated,—the vitreous humour is carried with the lens; and this being repeatedly done, what is the natural consequence but injury to the retina? and, at all events, the whole interior of the

eye is as it were stirred round and disturbed. No wonder that sometimes the very worst consequences should follow.

From this it appears that the nicety of the operation is to unsocket the opaque lens with as little disturbance of the vitreous humour as possible.

Reclination.

The reclination of the cataract is an operation with the needle, in all essential circumstances the same with couching; only with this difference, that the cataract is turned over, so that its upper margin being separated from its connection, is turned backwards and downwards, whilst the lower margin retains its hold. This operation will disturb the vitreous humour less, whilst the retina is less endangered.

Membranous cataract is the capsule left when the cataract is extracted or conched. It may have been originally the seat of opacity,—it may have become opaque. It is to be removed by a fine adjusted operation with the needle, passed either behind the iris or through the cornea.

Closing of the Pupil.

From various causes, the iris,—the most irritable body in the whole animal frame,—becomes inflamed, and inflammation leads to the closing of the pupil.

[It will depend on circumstances whether you must have recourse to general bleeding or not. Leeches are proper,—calomel and opium indispensable; and to counteract the disposition to the closing of the pupil, the extract of belladonna is put on the eyelids or temple, or the strained solution is dropped into the eye.

When the inflammation has ceased, leaving the lamentable consequence—a closed pupil,—an operation may yet save the patient from blindness.

The operation as performed by Cheselden, was to pass a needle (sharp upon the edge) into the anterior chamber, and to make a horizontal cut across the iris.

This would be quite effectual but for two circumstances. The same inflammation which has closed the pupil, has produced opacity in the capsule of the lens. Even if that should not be so, the capsule will be opened by this incision, and the absorption of the lens the consequence. There are so many ways of opening a new pupil, that the mode may be left to your ingenuity. Puncturing the cornea, pulling out the iris with the fine hook, and snipping it, is the most approved of.]

Fistula Lachrymalis.

There is a tear unbidden in the eye; a redness in the general

surface of the conjunctiva; an inflamed condition of the inner canthus. Press the lachrymal sac, and turbid mucus flows from the puncta. Such is the first condition of one threatened with fistula lachrymalis. I am of the opinion of Scarpa, that it begins with bad secretion in the conjunctiva, which being absorbed inflames the passage. The membrane of the nasal passage inflames and swells, the tears are obstructed, the nostril is dry. The inflammation of the sac and duct is followed by abscess, and that becomes fistula. The irritation of the eye is increased, and without the aid of the surgeon the disease is permanent. Distinguish this condition from a venereal disease of the os unguis. Distinguish also the complaint as it arises from irritation, and as it is depending on scrofula.

Cure.—Always remove the cause. Here you must correct the secretions. The fine ointment of red precipitate is applied to the edges of the eyelids. The lotion, p. 177, diluted, is a good collyrium; or a weak solution of muriate of mercury. There is no occasion to use the syringe to inject the puncta; it produces irritation. Empty the lachrymal sac by pressure with the point of the finger, and then drop the solution into the eye; it is readily absorbed, and again by pressure on the sac the fluid is pressed into the duct.

You have your choice of two operations, two means of restoring the flow of tears into the nose; 1. That by piercing the os unguis; 2. That of making the old duct pervious.

In the first an incision is made into the lachrymal sac. In doing this, take care that you enter your knife under the tendon of the orbicularis palpebrarum; for, if you cut that across, the action of the muscle distorts the eyelids in a remarkable manner. See that you are fairly within the sac before you perforate the bone; and in perforating the bone, (which may be done with the stilette of a small trochar,) do not waste your strength on the nasal process of the upper maxillary bone! but push upon the os unguis, which is as thin as paper, and easily yields.

After piercing into the cavity of the nose, a leaden probe is used, and kept in till the new passage cicatrises round it. It is worn for weeks, and when withdrawn, the descent of the tears keeps the passage into the nose open, whilst the outer wound closes.

[You may open the sac, pierce the bone, and introduce the silver style, as in the following operation. There is no necessity for wearing a great piece of bougie or leaden wire. The following method is preferred:

A style of silver of a length to reach from the canthus into the cavity of the nose, and with a flat head, (generally painted black,) to prevent it descending altogether, is passed into the old duct. If the fistulous opening admits the proper probe to be passed down, good; if not, you must cut into the sac. Having done so, you force a probe into the nose through the ductus ad nasum; and the

passage being thus made good, the style is introduced. It remains there, the tears make their way by the side of the instrument, and it is worn with very little inconvenience, until the passage becomes callous to its presence, and the disposition to close has ceased; the style is then withdrawn, and the outer wound heals.

Some will prefer introducing a little gold tube into the nasal duct, closing the outward wound over it. It is effectual. But the patient does not like it. The notion of imperfection in the cure teases him. It is apt to fall down into the nose; or, by its presence, it may cause an erythema around the eye.]

The diseases of the Eye which give occasion to the entire extirpation of the Organ. The Operation.

The extirpation of the eye is a melancholy resource, and yet it is sometimes demanded; for disease commencing in the orbit, involves the eyeball, and diseases beginning in the eyeball, will extend to the brain itself, if not early extirpated.

The eye is liable to three formidable diseases,—scirrhus, medullary fungus, and melanosis (see Dr. Mackenzie's work).

The high vascularity of the organ, and its exposed condition, render it liable to disease. The choroid coat,—the most vascular texture of the frame,—is sometimes the seat of fungoid disease. The office of this membrane being to secrete the pigmentum nigrum, the disease of the coat will necessarily partake of the melanoid character.

[The "melanoid tumour" is properly distinguished in other parts of the frame, by the secretion of melanotic matter (black matter) in the interstices of the cellular texture. But here in the choroid, such secretion partakes of its original nature.]

However, the fungoid disease of the choroid coat is of a formidable nature, and if the disease be distinctly marked, demands early extirpation. Either the disposition is present in other parts of the system, or it is rapidly propagated from the eye. A lurid appearance reflected from the bottom of the eye, with an enlarged condition of the veins of the eye, is very alarming. In the progress of the disease, vision is lost; the lens is pushed forward, and a dark vascular tumour projects through the sclerotic coat like a staphyloma.

On examining the eye after extirpation, it is found to be occupied with a soft black texture. You look anxiously to the state of the optic nerve, fearing that through it the disease has propagated itself to the brain.

The eye must be extirpated when it is the seat of carcinoma and fungoid tumour, when enlarged, protuberant, and ulcerated.

[Cancerous disease may involve the eyelids. It may begin in the lachrymal caruncle, and spread to the eye and eyelids.

All practical surgeons despair of eradicating the fungoid disease, even by extirpation. Through the optic nerve it has reached the

brain, by the time the disease is marked by external characters. They also agree in the propriety of affording their patients the chance of cure by the operation.]

Tumours in the orbit push out the eyeball; and these questions will arise—is this hydrophthalmia? Is the disease within the coats of the eye? When it is determined that the protrusion is caused by a tumour exterior to the eyeball, the consultation will take this form. Is the tumour sacculated? If the matter be let out, is it safe to let the sac remain? If it be a mere abscess, to puncture it will be sufficient. But if it be, as it most commonly is, a proper encysted tumour, the sac must be drawn out after it is emptied.

[See a well told case, Medical Observations and Inquiries, vol. iv. p. 371.]

Again, we shall suppose that there is no fluctuation,—that the tumour is solid, scirrhus; very serious questions arise, *e. g.* Did this disease begin in the lachrymal gland? You will know if it did by the tears being secreted or not. Has it embraced the optic nerve in a manner to make the extirpation of the whole organ necessary? The optic nerve may be considerably stretched and the vision remains; but if the eye is protruded, and the iris fixed, and the sight lost, it will be better to extirpate the whole. Again, has this tumour pushed through the orbital plate of the frontal bone? A tumour, even a soft one, will destroy both periosteum and bone; but if this should have taken place, then it will be announced by the frontal nerve being involved, and insensibility of the forehead. But worse than all, the disease may have propagated itself into the brain; in which case, you will probably have some sign in the insensibility or loss of motion of the parts.

If there be a sacculated tumour, you make an incision on the upper eyelid, (avoiding the conjunctiva,) open the tumour, and then endeavour to draw out the sac, dissecting it away.

If the tumour is in the orbit, and the eyeball untouched, an incision upon the upper eyelid may enable you to draw it out, and to dissect it away. If the tumour is too large to be extirpated without injury to the eye, or, if it surrounds the optic nerve, the eyeball must be taken away.

You begin the operation of extirpation by slitting up the outer canthus. You then dissect up the upper eyelid, and cut the conjunctiva. You now, with due regard to the direction of the bones which form the orbit, pass your knife deep, and cut across the optic nerve, the ophthalmic of the fifth, and the origins of the recti muscles. Then seize the mass with the tenaculum or hooked forceps, and pulling forward, you cut the remaining cellular connections. Divide the tendon of the elevator, and the tendon of the trochlearis. The whole coming then forwards, you divide the conjunctiva of the lower eyelid.

[An awkward operator will keep cutting round and round the eye, with useless repetitions of incisions, prolonging the tortures of the patient. Whereas the eye cannot be brought forward until the

nerves and muscles be cut across near the foramen opticum. Another reason for this being done early is, that from the moment these nerves are cut across, the operation ceases to be a painful one.

It is a useless piece of cruelty to pass a great cord across the eye, in order to pull upon !

Unless the scalpel be curved, it follows that the optic nerve, and parts in the bottom of the eye, must be cut obliquely.

The dressing is a simple filling of the orbit with soft lint, and over that a compress and bandage. The eyelashes afterwards give some trouble, being directed inwards. A little bit of dressing between them whilst the parts are tender, and afterwards the application of adhesive plaster will remedy this.]

CHAPTER XXXII.

DISEASES OF THE JOINTS.

On studying the diseases and accidents to which the joints are exposed, there are some relations which must not be lost sight of. You would do well to review the peculiarities in the structure and constitution of all the textures which enter into the construction of a joint ; to consider to what kinds of inflammation they are most liable : and how to distinguish the scrofulous, arthritic, and rheumatic inflammation, as seated in the articulations.

A joint, from the cartilage which tips the bone to the outer tendon—the cartilage—synovial membrane—capsular ligament—accessory ligaments—bursæ—fasciæ and tendons—are all of a class of parts, low in their vitality, certainly the least vascular parts of the frame, and very peculiar in their degree and kind of sensibility. By all this it is made apparent why they are subject to certain diseases, and why inflammation rises in them in a different manner from what it does in other parts.

[Let us take a wound of a joint, as directing the mind to this peculiarity. Suppose that a workman strikes the lower head of the femur with the corner of his adze or chisel, where the capsular membrane is reflected. The synovia escapes. It is a penetrating wound of the joint. As in other penetrating wounds, if it heal, all goes well, and you hear no more of the accident. But if it should not unite, and the edges of the wound turn out with a pale granulation rising, although for some days there is nothing to alarm the man, yet the joint becomes stiff, and creaks in motion. It swells, becomes painful, and by-and-bye inflammatory fever to the greatest excess is lighted up. The pulse is frequent and strong, the face flushed, the eyes brilliant, the teeth are grinding with pain ; and if this condition be permitted to go on, suppuration in the joint,

and in the cellular membrane around it, are the inevitable consequences, and by-and-bye the sufferer sinks in confirmed hectic.

Take the instance of sprain, as exciting a destructive but more chronic inflammation in a joint. Suppose a man receives a contusion on the great trochanter, crushing in the head of the thigh-bone upon the acetabulum; or a woman sprains the lateral ligament of her knee; a more languid inflammation is set up, with pain, and lameness, and swelling, but not in the acute degree I have just described. What is the effect? 'The ligamentous texture suffers an entire change: instead of these ligaments possessing their dense texture and silvery whiteness, they have become unusually vascular, loose in texture, and of a gray colour. They are no longer suited to control the motions of the joint, or to direct the actions of the limb; the patient, from the inflammation, tenderness and looseness of the ligamentous textures, is irrecoverably lame. If with this we have a strumous constitution, a white swelling with all its evils will be the consequence.]

View the accident and its consequences in another light. Suppose a lad has fallen over a sharp stone, which has bruised the capsule of the knee-joint, and that a violent inflammation is set up in the knee. It may happen that, after suffering excruciating pain and fever, the inflammation subsides. But union has taken place in the surface, and following that, complete ankylosis—that is, union by bone. It is in all respects interesting to observe the consequences of the loss of motion in the joint, the loss of its natural play, and stimulus to perfection of structure. Synovial membrane, ligaments, bursæ, have degenerated from their natural texture into a uniform mass, little if at all different from the cellular membrane; and the muscles, whose proper office was to move the joint, being equally deprived of their action, lose their massiveness, and waste away.

[This effect of loss of action should be thoroughly understood, and I have never found a more illustrative case than that narrated by Baron Larrey. A dislocation of the shoulder had taken place, with such violence that the head of the humerus was thrust between the ribs, where it lay in contact with the soft and yielding lungs. Can you suppose a more secure place of lodgment? And yet there the bone wasted and lost its form, and the head was no longer recognisable!]

'These are admirable illustrations of Mr. Hunter's doctrine, that the free use of a part is necessary to the perfection of its structure.

We learn from these views what is necessary in the treatment of inflammations of the joint proceeding from violence.

Whilst yet the inflammation is confined to the limb, bleeding by leeches is to be preferred; but when the inflammatory fever rises to a great height, on the principles laid down, (p. 6,) you must have recourse to the lancet, and after that the purgative with antimony, and after that the opium and calomel, and failing that, the colchicum; the acetum colchici in the purgative draught, or the extract

in a pill. You do not attempt counter irritants in the violence of the attack; but in the chronic state, liniments, such as that with oil, turpentine, and acids—the linimentum ammoniæ cum opio—blisters—mercurial dressing—steaming—the warm douche, &c.

When the inflammatory action has subsided, if the joint retain the slightest power of motion, passive motion, friction, clamping, and stimulating liniments may yet redeem the joint.

You perceive the advantage of the quack and the rubber: by loss of motion the structure is lost; by regular exercise it is restored; and the only secret is to stop short of exciting to renewed inflammation, and to subdue it as it rises.

There is another consequence of inflammation of a joint combined with motion, which the practitioners would do well to consider.—Return to page 112.

Loose Cartilages in the Knee-joint.

How these bodies are formed is not satisfactorily explained: it is, however, sufficient to our present purpose to observe, that they can be traced to a remote inflammation in the joint. They are firm, smooth, and lubricated, generally about the size of an almond. They glide about, and are with difficulty fixed.

[A young man shall be in full vigour and activity—perhaps playing a match at cricket—when he will be tripped and thrown down, attended with a sickening pain in the knee. The cartilage which lay in the recesses of the joint has been forced between the bones, so as to check or lock their motion. The sufferer must go limping home, unless, by bending the knee, and by a certain manipulation, he can get the body to resume its place. This condition of the joint is combined with effusion of fluid into it.]

The practice in these cases is, first, by bandaging, to cause the absorption of the fluid, and to keep the parts so braced that the loose cartilage is confined. But this is only palliative, and we are sometimes called upon to extract this body. From what is delivered above, you perceive the danger of wounding the joint by this operation; and therefore I have preferred the practice of Mr. Copeland of London, which is, to chase up the cartilage with the points of the fingers to the line of the reflection of the capsule upon the inside of the head of the femur, and there to fix it with a ring and compress and bandage. Singularly enough, the cartilaginous body adheres; and if it adheres, it is absorbed.

If the operation of extraction must be done, I would advise the following manner:—1. Having forced up the body on the inside of the head of the femur, it is the business of the assistant to hold it there, with every precaution against it slipping away. 2. Draw the integuments aside, and make the incision with a very sharp scalpel, carrying it lightly so as not to press on the cartilage. 3. When the thin synovial membrane alone covers the cartilage, pierce it with a strong couching needle, and strike the cartilage so as to

fix it. 4. And now, drawing the knife lightly by the side of the needle, you cut the capsule, and lift out the cartilaginous body. When the wound is permitted to retract, and the integument to take its natural position, the incision is oblique, and will more readily adhere than if the cut had been made direct into the joint.

[When I have seen the cartilaginous body escape into the joint during the operation, the consequences have been disastrous. The working of the joint to get the body again into its place, and opposite the wound; and the escape of synovia and exposure of the joint, have been followed with all the consequences which I have stated to arise from an accidental wound of the joint; and it has been necessary, from the wide spreading suppurations, to amputate the limb.]

Dropsy of the Knee-joint---Hydarthrus.

Effusions into the knee-joint may come, like other dropsies, from the weakness which follows inflammation; but most frequently they arise from some defect of constitutional power, neither definable nor very obvious, unless in their consequences. We see it in the strumous, and in that condition produced by the debilitating effects of mercury; and sometimes in the strongest frames, when we must turn in our minds the possibility of arthritic or rheumatic inflammation being the cause. The swelling is colourless, but you easily distinguish it from white swelling by the undulation, and the distinctness with which you feel the patella and points of bone.

You see a fulness on each side of the ligament of the patella; it undulates on tapping with the finger. You perceive a fulness above the patella, and in the bursæ, under the tendon of the quadriceps muscle. If the disease has gone far you press down the patella, and you are sensible that it is, as it were, floated off the trochlea of the femur, and you feel that you can strike it against the surface of that bone.

[By the application of a roller, in a night's time the fluid may be made to disappear by absorption. But this is not a cure. The disposition to this superabundance of secretion must be destroyed. The local means are, rubefacients and blisters; stimulating liniments, with cantharides or with iodine; the ointment with hydriodate of potass; stimulating plaster, rolling, &c. The constitutional means are, alterative mercurials in pills, liquor potassæ in bitter infusion, sarsaparilla in various preparations with lime-water, bark, and soda. In the convalescent state, let him have a laced knee-cap. As to opening the joint to evacuate the fluid, the proposal is ridiculous, as you can always cause the temporary absorption of the fluid by pressure. You gain nothing by puncturing but the danger of an incontrollable inflammation.]

Scrofulous Inflammation of the Joints. White Swelling.

The whole apparatus of the knee-joint from the cartilage to the integument—the cartilage, synovial membrane, capsule, ligaments, bursæ, and tendons—are of one texture, certainly of one disposition as to disease; they are prone to scrofulous inflammation. The disease is apt to be formed by injuries, as blows and sprains, especially in a reduced state of bodily health; more apt to be produced by the strumous constitution. It may take place without any direct cause, partly from strumous constitution, when the case must be considered as most unfavourable.

The term white swelling (*tumor albus*) is a very proper term; it characterizes the peculiar nature of the swelling, which arises from disease of the internal apparatus of the joint—the synovial membrane or cartilage.

For example, if a young woman should present in the waiting-room of an hospital with a great swelling of the knee, inflamed and red, and tender to the touch, that is not a dangerous complaint, it is *the house-maid's knee*; she has been hard at work on her knees scrubbing the floors,—an honest, industrious girl, and so you can comfort her by saying in a short time she will be well. But if the next patient have a swelling of the knee not compressible, (*nulla pressione mutabilis*;) with no discoloration, but only a few blue veins visible upon the surface; if she has had deep pain without apparent cause; if the hamstring tendons begin to be rigid, and the swelling feels as if it were an actual enlargement of the bones, (which it never is,) that is the formidable white swelling of the knee, the *fungus articuli*.

In the second stage of this disease, paroxysms arise from time to time; the pain is great, with fever, and followed by suppuration, and abscesses burst, with relief. But unfortunately, the inflammation rises again and again, and at each period of aggravated pain there is abscess, and these abscesses degenerate into sinuses, which surround the joint, and which in the end communicate with the cavity of the joint.

In the last stage, you see the knee-joint large, and larger by contrast of the wasted thigh and the wasted leg; contracted, owing to the rigid condition of the hamstring tendons.

On dissection of such a joint, the synovial membrane has become vascular, and hangs in gray shreds; the cartilages are ulcerated and wasted; the ligaments have lost their brilliant shining and dense structure; the whole apparatus of the joint has degenerated.

Treatment.—Understanding always the necessity of attention to the constitution, the local remedies are these:—1. At first the donche of warm salt-water; friction of stimulating liniments, and rolling with flannel. 2. Blisters in succession round the knee. 3. Surrounding the knee with slips of lint, spread with equal parts of mercurial ointment and emplastrum thuris; over this oiled silk; over

that cotton wadding, and over all a light roller. 4. Caustic issues or moxa, covering these with the water poultice.

I have procured ankylosis (which in the advanced stage is the only means of cure), by passing a seton across the knee. But, on the third attempt, I lamentably failed. Nothing of this kind should be attempted unless in desperate circumstances, and where the patient is prepared to submit to amputation if the effect should be dangerous inflammation.

As to the question of amputation, we may look upon it in the first place, in this light. It is not any particular condition of the knee that authorises amputation, but that the hectic fever consequent on the local disease is endangering the life, and when it appears that he will sink, unless the source of irritation be removed.

But, again, conceive a lad at a period of life when he should be obtaining his education, or learning a profession or an art on which his future subsistence must depend, the limb is contracted and wasted, so that even if he could stop the disease in the joint, he must be lame for life, there may in this case be propriety in amputating.

It is essentially the same disease which appears in the other joints, the character somewhat altered by the peculiar position or structure of the joint, as, for example, when the disease is in the hip-joint.

Disease of the Hip-Joint. Morbus Coxarius.

[This is the scrofulous inflammation of the hip-joint. *Camper* finds it most frequent in children of a year and a half old; *Albers* between the third and the twelfth year; *Morgagni* mentions the occurrence in an infant. I have detected the convulsions of a child to be attributable to commencing abscess over the hip-joint. Indeed, I am of opinion that the joint is sometimes hurt in delivery, when there is a cross birth or breech presentation. I have known the thigh-bone broken in bringing down the extremities in the latter case. Men of fifty and sixty years of age have inflammation of the hip-joint. It is then you will have difficulty in distinguishing the complaint from sciatica and from rheumatic affection of the muscles of the hip.]

Pitch of the Pelvis. Consecutive Dislocation.

When the hip-joint is inflamed, there is an insensible effort made to relieve the inflamed capsule from pressure, by relaxing the tendons of the muscles which pass over the anterior part of the joint. These are, the psoas and iliacus internus muscles. To do this the knee is raised or the body bent forward. The patient lies habitually on the other hip, and the spine is bent to the diseased side. The consequence of this continued position is a poisoning of the

pelvis that raises the ilium of the diseased side higher than the other, and appears to shorten the extremity which is diseased.

Another peculiarity in the position of the patient with diseased hip, is that of throwing the thigh of the affected side over the other, that the head of the thigh-bone may be raised so as to relieve the inflamed socket. The thigh-bone becomes as a lever loaded at the lower end, by which the upper end is raised, and the pressure taken off the inflamed glenoid cavity. It is a position of great relief, but the consequence is actual dislocation in extreme cases; for the strength of the ligaments being destroyed by the process of inflammation, the head of the femur is actually raised out of its socket and drawn aside. However, the appearance of dislocation is very frequent, the actual dislocation exceedingly rare.

A circumstance which puzzles not a little is, that in some cases of diseased hip, the signs, as regards position, are all reversed. The limb is longer! The explanation is, that the lad has been limping about with his diseased hip, and not confined to bed. The same cause,—the inflammation and tenderness of the hip,—makes him throw the affected limb forwards. He never permits the weight of his body to come perpendicularly over the limb of the diseased side; for in that case the weight would bear on the inflamed hip. He bears on the sound side, and pushes the diseased limb forward, which at length produces an obliquity of the pelvis,—a pitch exactly the reverse of what takes when the patient is confined to bed. The limb seems longer.

A writer adds, he “cannot understand how parts so remote as the spine and the hip should affect each other.” This comes of studying surgery without the basis of anatomy. See what has been delivered under the head of lateral curvature of the spine, p. 82-3.

The hip disease sometimes attacks by slow degrees; the boy plays with his companions, and while heated and active is not lame, but when he comes home at night, the hip becomes stiff and painful. By-and-bye the lameness is more apparent, and rather to his parents than to himself. This is the condition of the hip which may be confounded with the blight or want of growth in the whole extremity.

In examining the lad, place him stooping forwards, his back towards you, the clothes thrown up! 1. You perceive a difference in the convexity of the nates; the diseased hip is flat, and appears broad; the sound hip convex, with the peculiar form given by the action of the gluteus muscle. 2. You now lay him at length; observe the length of the extremities, compare the knees or heels with the relative place of the superior anterior spinous process of the ilia. 3. You take hold of the sole of the foot, and push the extremity up so as to make the head of the femur strike into the acetabulum. 4. You press behind the trochanter major. 5. You rotate the thigh-bone. 6. Finally, see if he can stand and raise the other foot from the ground.

Before you have done all this, you will have discovered inflam-

mation of the joint, if present. You farther inquire, has he pain in the inside of the knee? does he start in his sleep with spasms in the limb? is he hectic, with fever at night?

The disease being confirmed, it is too easily characterised. The thigh is wasted, is raised towards the body; the hip is protuberant, inflamed with abscess, making its way under the integuments; the abscess becomes an open sinus, and the patient is wasted with confirmed hectic.

[*The effects as visible on dissection* are, 1. Inflammation and swelling of the soft secreting substance around the ligamentum teres; 2. A loose condition of the capsular ligament; 3. Ulceration of the cartilages of both surfaces; 4. Abscesses degenerating into sinuses around the hip; 5. The head of the thigh-bone absorbed; 6. The acetabulum ulcerated through; 7. Scrofulous matter in the bones; 8. In the chronic case, irregular configuration of the head of the thigh-bone and of the acetabulum, with porcellaneous surfaces of thin bones.]

The natural cure of this formidable complaint is by the occurrence of circumstances, which stop the motion, and consequent attrition of the inflamed parts, when the disease terminates in ankylosis.

[*Treatment*.—1. On the first suspicion, the warm salt hip-bath, with stimulating embrocation; liniments; the warm stimulating plaster. 2. Rest enjoined, with a pillow between the knees; a succession of blisters. 3. Issues; when attended with pain in the knee, a blister on the inside of the thigh; a seton there. 4. Moxa or the cauterly applied in successive spots round the hip. Attempts should be made to fix the joint.

When the cure has taken place in consequence of ankylosis, and the thigh-bone has stuck out at right angles to the body, it has been ingeniously devised to cut across the cervix, and to allow extension of the limb!]

One more important discussion remains under this section. It regards the excision of diseased joints. The idea was suggested by Mr. Park of Liverpool, in the last age. He cut off the diseased surfaces, in white swelling of the knee, a very bold operation. This operation, I believe, is not now executed. However, we have seen that the head of the humerus may be taken away, with the surface of the glenoid cavity of the scapula. The excision of the heads of bone entering into the elbow joint, is an operation frequently performed. Mr. Arnott, my colleague in the Middlesex Hospital, patronised this operation, and several times performed it. I do not object to it when there is a portion of exfoliating bone, but I do when there is only disease of the synovial membrane and cartilages, and sinuses around the joint; for such a case is to be cured by ankylosis.

[Your first attention, *as in all these cases of diseased joints, is directed to the restoration of health*. Your next object is to secure perfect rest to the inflamed surfaces, by fitting a proper tin-splint to

the arm, taking care that it shall correspond with such a degree of flexion, as in the event of success will leave the hand at liberty. You must spread slips of lint with a composition of the emplastrum, and mercurial ointment. These you place round and round the whole joint, above and below, leaving passages for the discharge from the sinuses. You then roll the arm carefully from the wrist nearly to the shoulders, opening a hole (*une fenêtre*) in the bandage opposite to the ulcer or sinus. You then lay the arm on the hollow splint and secure it. But, above all, you are careful to keep the arm above the level of the body on pillows, whilst he is in bed, and supported high by an apparatus resting on his side, if he be otherwise in a condition to walk in the garden.

By such means you will see the œdema of the arm subside, the discharge diminish, and the health recover; and in time ankylosis will be accomplished.

You perceive the same means in all cases of ulceration in the lesser joints.

Professor Syme has successfully practised the excision of the ends of the bones, and has published on the subject.]

CHAPTER XXXIII.

ON TUMOURS, CANCER, AND DISEASES OF THE MAMMA.

Mr. Abernethy conceived that he had made an important step, when he defined "*tumours* to be such swellings as arise from some new production, which made no part of the original composition of the body." By this he meant to exclude all "simple enlargements." But whatever he meant, the definition does not accomplish the distinction. A diseased growth: *morbosum augmentum* is nearer the truth, for a tumour may have the most formidable effect, and the most threatening aspect, and yet contain no matter distinguishable from what in other localities is natural, *e. g.* fat, bone, &c. "Diseased nutrition" is better, and yet *nutrition* is not the word.

We must return to our first position, that, while the whole frame of an animal body is ever changing, it is controlled, its texture, composition, and exterior form, preserved by a law of the economy. When this natural and healthy process is disturbed, and a morbid growth substituted, it has the essential character of *tumour*. Let us only distinguish that excited state and increase of the natural actions, as in phlegmon, and we shall separate mere tumefaction from morbid increase or tumour.

[The discussion on Mr. Abernethy's argument, drawn from the statement of Mr. Hunter, must not occupy these pages. See preface to his Classification of Tumours.]

I shall just cite one of his cases, page 12, in illustration. "A medical practitioner bruised the upper part of his thigh against the pommel of his saddle, in consequence of the horse starting. The bruise and inflammation soon disappeared, but after some months he perceived a tumour, &c.; he came to London and had it removed. It was an adipose tumour," &c. Now, my distinction is this: the "inflammation and tumefaction" first arising was a natural consequence of injury; the growth which commenced when the tumefaction subsided was a *tumour*, a morbid increase, in which the natural dimensions were overleaped, and *with no tendency to restoration*, no controlling influence to restore the natural configuration.

It is a consequence of this theory, that parts which have ceased to be in full action, by ceasing to have the natural control, fall subject to disease: thus do the mamma, the ovaria, the uterus, to which we may add, perhaps, the prostate gland.]

Tumours may be arranged according to their structure, and composition. As, for example, tumours *by preternatural growth of substance*, which will embrace tumours of the skin, fatty tumours, and simple exostosis.

Again, tumours, unnatural in structure and form, and containing matter foreign to the body, as polypus, sarcoma, fungoid tumour, carcinoma, &c. Lastly, encysted and secreting tumours.

[Mr. Abernethy's enumeration is this:—1. Common vascular sarcoma. 2. Adipose sarcoma. 3. Pancreatic sarcoma (in structure like the pancreas.) 4. Cystic sarcoma. 5. Mammary sarcoma (like the mammary gland in structure). 6. Tuberculated sarcoma. 7. Carcinomatous sarcoma.

I must admit that these distinctions serve no practical purpose. The whole essay is inferior to Mr. Abernethy's other writings.

The French have other denominations; *e. g.* Scirrhus tumour—Encephaloid tumour—Fibrous tumour—Mélânose tumour—Tubercle—Cartilaginous tumour—Fibro-cartilaginous tumour.

The melanoid tumour may require a note. In some tumours, and in some conditions of the cellular membrane without tumour, there is the infiltration of a dark substance like the pigment of the choroid coat of the eye. See Diseases of the Eye.]

I shall not engage you further in this very unsatisfactory discussion, but proceed to make some remarks on the treatment of tumours.

The *sclerotic state*.—Distinguish the condition (generally the forerunner of real tumour), which arises from mere irritation, and the interstitial secretion of coagulable lymph. I would call it scirrhus, were not the term somewhat indefinitely used, and sometimes applied to the most formidable tumours; for it is the consolidation of a part by interstitial deposition, without peculiarity of action. This is the curable condition of what are called tumours.

[The intelligent practitioner discovers the cause of this excited action, *e. g.* swelling of the testicle, to be in the urethra,—swelling

of the mamma, to be in the uterus; and whilst he diminishes the action, he removes the cause.

The means directly applicable to the state of the tumour are repeated leeching—counter irritation, as blisters and setons—the mercurial ointment—the ointment of the hydriodate of potass—rest and compression with appropriate alternative courses of medicine.]

When you have to take out a tumour, consider its nature, and what is the natural limit to the diseased action: for example, the capsule of the cellular membrane which surrounds a gland does not necessarily participate in the disease; it becomes firm and more distinct from the pressure of the growing tumour, but still it is no part of the disease: therefore such a tumour, though seated deep, is easily taken away; for, having cut down to the proper surface of the tumour, the handle of the knife and the finger goes round it, without further dissection.

In taking out such a tumour, you will find it retained at one point; that is, where the vessels and nerves pass to it; and on cutting that connection across, the artery will spring.

On the other hand, in operating on the various fleshy tumours to which authors have given the name of *vascular sarcoma*, *fibrous sarcoma*, and *cystic sarcoma*, let this be the first consideration—are they limited by a capsule (not a cyst), or have they extended by drawing in the surrounding substance into their own nature. In the latter case the operation is desperate, because you have no limit nor direction, and must cut wide, and take away all that is suspected to be contaminated. This precludes the attempt at extirpation when the tumour is seated among important parts.

Scheme of operation on a Tumour.

Let us take an example of a tumour to be extirpated, and see how an experienced surgeon would set about it; *e. g.* a tumour on the angle of the jaw.

He would, *first*, consider if it were loose or attached; he would relax the *platysma myoides* and *risorius Santorini*, observing if they held it down, and gave it the appearance of adhesion which it had not in reality. *Secondly*, He would press the veins low in the neck, to make the external jugular swell, so that in his incision he should not unnecessarily cut it across. *Thirdly*, If the incisions must pass over the cheek, he would pass Anel's probe into the parotid duct, to guard that duct during the operation, intending if possible, to avoid the duct, and the trouble of a fistulous opening afterwards. *Fourthly*, He would calculate the depth and attachments of the tumour, with respect to the external carotid artery and its branches. By this he would have a forecast of what was necessary to take up the carotid, or so to expose it that it might be held and compressed during the operation.

In the same way are the operations on other glandular tumours—

e. g. in the neck or axilla—to be studied, and the plan of operation determined by the anatomy; and the bearings of important parts.

Cystic tumours.—In operating on cystic tumours, whatever may be the contents, the cyst is the disease, and must be brought away. It is the cyst which secretes, and it is the consistence of the secreted matter that gives the name of *steatome*, *atherome*, and *mellieres*. When the matter is merely evacuated, a fungus springs from the interior of the sac.

[It is from the inverted cyst that these extraordinary horn-like excrescences are derived, of which you may read strange things.]

The wens so common on the scalp of adults are *atheromatous cysts*. See that you manage their extirpation better than I have witnessed in operation. I have seen the surgeon cutting them out by dissecting them round with the same pleased expression and professional pride which is given to the painter in Hogarth's print. Nor should you puncture and squeeze out the matter; but do this. With a sharp scalpel cut the tumour through at once, after which the patient should not feel the slightest pain; for you seize upon the sac, and the slightest touch of the knife allows you to draw out one half, and then the other. The integuments fall together and fill up. Not so, however, if you pinch, and bruise, and irritate.]

When tumours are malignant, such as the *carcinoma*, the *medullary sarcoma*, and *fungus hæmatodes*, you must be cautious in promising a successful issue.

[1. Has it been rapid in its growth hitherto? (because tumours have a prescribed life, and as their early stage is, so will their later be). 2. On tracing the lymphatics to the first set of glands, is there an inflamed cord,—are the lymphatic glands affected? 3. How is the countenance,—is it natural and healthy, or dull and earthy? 4. Are there any internal affections, scirrhus of viscera, &c.? 5. Does the tumour adhere to the great vessels,—to the joints? Has it drawn in the membranes of the great cavities?

All these circumstances are taken into consideration by the experienced surgeon, who values his patient's life and the credit of the profession, more than the eclat of an operation.]

In considering the practical question as it regards tumours which have no capsule, or condensation of cellular membrane around them, we ought to include those fungous bleeding tumours, which readily draw the surrounding substance, be it what it may, into the same diseased condition. It signifies little where or when I made the observation, but much experience has confirmed the observation, that these tumours have in their nature a capacity of destroying surrounding structure, without the usual effects of reaction or thickening. They, in coming into contact with the great vein of the thigh, for example, will open it in such a manner, that the blood from the vein will be poured into the cellular membrane of the tumour; and then it will become a question whether or not the tumour has been caused by a "bursten vein," or be of the nature of aneurism, for as it opens the veins, so may it open an artery.

These fungous tumours are found with layers of coagulated blood in them; not originally the product of the tumour, but resulting from a circumstance not less formidable,—the destruction of the coat of the vessel with which they lie in contact.

[See Scarpa on Aneurism; John Pearson's Medical Communications, vol. xi.; Pott's works; *Observ. sur de Tumeurs Sanguines*, par M. Breschet, &c.]

There is one circumstance which these celebrated men and their successors have failed to notice, viz. I have long since explained that the pulsations of the foot, when one leg is placed over the other knee, are not from the pulsation of the popliteal artery, but from the united forces of the muscular arteries of the calf of the leg. Now it happens, that when these tumours grow, as sometimes they do, from the head of the tibia, or are in other circumstances whereby they receive the pulsation of the great mass of capillary arteries,—that they receive an impulse and pulsate; hence have arisen the questions which are discussed in the ingenious M. Breschet's paper,—Are they aneurisms, and can they be cured by the ligature of the artery?

OF THE PERIOD OF LIFE AT WHICH CARCINOMA MAMMÆ AP-
PEARS, AND THE MANAGEMENT OF THE FEMALE CONSTITUTION
WHEN THREATENED WITH SCIRRHOSES.

1. There is a family peculiarity of constitution connected with carcinoma. A woman in whose family scirrhus has appeared ought to be more than usually cautious in attending to her health, and to the functions which have been called "non-natural," as she advances in life.

2. There is in my mind a strong alliance between scrofula and cancer; so that, in a family in which struma is inherited, there ought to be special attention paid to the women of that family at the change of life.

3. It is with carcinoma as with other diseases; it is apt to prevail in the descendants of such as have suffered from the disease. "I am come to you," says a patient, "because my mother and aunt suffered from what I am now threatened with."

4. The age at which the disease prevails is from forty-five to fifty-five. The mammary form of the disease is more acute, or runs a more rapid course at forty-five, than from fifty-five to sixty-five or seventy.

5. In man, as well as in females, we observe a climacteric period; and it is well to notice what takes place independent of uterine disturbance.

This condition is marked by a gradual decay of strength, a listlessness of mind, and incapacity for business; sometimes great depression of spirits; the secretions are wrong; an irregular slow fever affects him; there is thirst, but no want of appetite; and there is increased action of the kidneys.

At such a time the mind should be supported by friendly and social intercourse, travelling, and change of scene. The digestion should be watched, and exercise enforced.

If at such time some family misfortune or great distress should unhappily befall, ten to one that the patient will not bear up against it; some organic disorder will begin to show itself, with a certain indefinite change in the countenance and general appearance; but very often this condition passes off, and vigorous health is again established.

6. By this depression I mean to infer, that in women the change of constitution may not at all times depend upon uterine influence, but may have a source more akin to what takes place in the other sex.

7. Yet I must affirm, that, in ninety of one hundred instances of constitutional disturbance at the period alluded to, the ovaria and uterus are the source of disturbance.

Every change in the ovarian circulation has its effect upon the mammæ. Menstruation, conception, quickening, delivery, all influence the breasts; and on the final termination of ovarian action at the turn of life, the irregularities in menstruation produce the most decided influence on the mammæ, and lay the foundation of the disease which we are considering.

It is the disturbance of the uterine system, which, at the change of life, produces irregular flushings of the face and depression of the spirit. We may see the individual flush, and hear her sigh; she then breaks out into a perspiration, and the attack is over. This condition of the female system is said to subject them to inflammation and congestion, rheumatism and erysipelas. I am inclined to believe that it does.

8. The number of young women, from the age of sixteen to twenty-five, who have presented themselves in the Middlesex Hospital with lumps in the breast, is fully equal to those who have presented, at a later period of life, with carcinoma. We have to trace an influence of the same kind in both. Irregular uterine action will, at the earlier period, produce strumous lumps in the breast; at a later period of life, the same influence will lay the foundation of carcinoma.

[A young woman from the country presented herself, with a hard tumour in the mamma, to have the breast removed. It was decided in consultation that it was unnecessary. Upon inquiry, it was found that she had suffered the other breast to be removed, under circumstances exactly similar to what now presented in the remaining breast. This young woman went out well.]

We have a parallel instance in man. A sore throat will swell the glands in the neck of a youth, and they will come to scrofulous suppuration; a similar irritation on the lymphatic vessels in a man of fifty or upwards, will produce a scirrhus tumour of these glands which will not subside.]

As there is a coincidence in time, so is there a considerable

resemblance in the nature of diseases which fix upon the ovaria and mammae. The difference is chiefly owing to *their position* as *internal* or *external* parts. The scirrhusities and hydatid tumours to which the ovaria are subject, would become fungous ulcerated tumours were they attached to the skin.

On the other hand, many of the hydatid and encysted tumours which infest the mamma, and are the forerunners of so many distressing cases of fungous ulcers and ill-conditioned sores, would smoulder, and partake of a chronic state, that would hardly interfere with the term of life, were they seated in parts internal.¹ This consideration has led me to the practice I have to recommend in dressing the breast.

[¹ This is illustrated by the progress of abscess: of a ball towards the surface—of diseased bones—of a lymphatic gland.]

These remarks lead to distinct objects in practice; to remedy the defects of the female constitution, and to allay the local irritation of the uterine system of vessels. I have mentioned the condition of the constitution in men at this period of life; and I may here notice, that the prostate disease offers a fair parallel with the glandular disorders of the female; and that it is one of the sequelæ of the same condition.

To me, who in early life knew the merit of Dr. Plummer's pill and diet drink, and its habitual use by the old practitioners of Scotland, it was matter of surprise, about five-and-twenty years ago, to see the same treatment become quite the fashion in London under the authority of Mr. Abernethy's name. That gentleman had the unhappiness to estimate public opinion very low; and, singularly enough, the manner which marked his contempt became the source of increasing popularity. I speak of this, because I am apprehensive lest the admiration of Mr. Abernethy's practice may have gone so far as to produce a sort of reaction, and that it may become altogether neglected.

But the system is founded in reason and in experience; the blue pill and the bitter purgative—the compound calomel pill and the sarsaparilla, are the means of exciting the secretions of the bowels, and of soothing them by removing whatever irritates.

The bowels may be disturbed, and yet neither pinch nor give pain, but only produce irritability and nervous depression; or they may lay the foundation of organic disease.

It is only a wide experience that can exhibit this; and to a patient, judging by his individual experience, the conduct of his physician appears like obstinacy.

With respect to the irregular and disturbed menstruation, it may be taken, as a pretty general rule, to treat it by a cooling regimen—the tepid shower-bath—much gentle exercise in the open air—and change of residence, if circumstances admit of it. Travelling imposes on the rich and indolent a condition the most nearly approaching to that state of nature and freedom which the peasant has by necessity.

There will be found in the following cases, notices of women of a corpulent habit, and in apparent health, but with pains in the breasts, enlargement of the belly, sickness and suppression of the menses; such women, without much care, will have confirmed scirrhus.

When the menses terminate suddenly, and recommence with something like flooding, we cannot but suspect some disease, already showing itself in the uterus; and that the flow of *blood*, with unusual pain, proceeds from some such source of irritation.¹ This is the condition which requires the utmost attention: camphor, in pretty full doses (gr. iv.), with extract of hyoscyamus (gr. iij.), and opium (gr. ss), may be given to allay pain.

[I have attended in consultation, on the supposition of confirmed cancerous disease of the uterus, when the case has terminated favourably by the delivery of a mole or clot. However, disease in the uterus produces hemorrhage, and an accumulated clot; which being discharged, another forms, and the distress returns after some months, and is again relieved in the same manner. But the clot is the accidental effect of the issue of blood; the accumulated mass is delivered, but the *disease* is progressive, and is at last attended with the usual and characteristic symptoms.]

It certainly is not desirable to see the menses suddenly interrupted; small bleedings (*les petites saignées*) at this period used to be much the practice. I confidently recommend the blood to be drawn from the hemorrhoidal vessels by leeches once a fortnight.

The warm salt hip-bath has a very soothing influence.

When there is pain shooting from the back to the pubis, and tenderness of the spine, which is a very frequent attendant on uterine irritation, warm fomentation, with anodyne extracts in solution,¹ applied to the *os tincæ* and vagina by a properly contrived injecting apparatus, serve much to allay irritation.

As soon as there is any indication of disturbance in the mamma, a seton or issue should be made in the arm.

With respect to purgatives, it may sometimes be proper to use aloetic and other warm purgatives; which operate on the rectum and hemorrhoidal vessels; but sometimes these are to be especially avoided, and rhubarb, senna, sulphur, and jalap, to be preferred.

In the case of threatened carcinoma, a change of diet is advisable; nothing is so effectual in inducing a change on the constitution. Coffee and milk for breakfast; rice-milk, with cinnamon, in the forenoon; pudding of sago, and an egg, for dinner; and milk and soda-water, with a biscuit or rusk, in the evening, is enough of nourishment. If our patient has been in the habit of taking meat at dinner, with a heavy supper, and something comfortable at bedtime (which is the way of life led by a large proportion of the

¹ Mucilage of quince seeds, and extract of hyoscyamus or conium. The pipe being passed through a piece of sponge, the vagina may be filled without pain or inconvenience.

middling classes), we may expect present advantage from such a mode of living as I here advise.

The treatment constitutionally and locally, which is adopted with advantage in cases of struma, is advisable in threatened carcinoma.

Of superficial and deep seated parts as influencing the progress of Cancer.

By an external part I mean such as, being seated near the skin, is rapidly drawn into action through the influence of the vascular surface. A deep or internal part is removed from this influence, and its diseased action is proportionally slow.

The ovaries and mammæ are in some circumstances very similar. They lose their natural functions at the same time; they are subject to morbid excitement at the same time; and they, in fact, exhibit similar diseased appearances. But they differ in this,—that the ovaries have their natural structure destroyed and obliterated, and become the seat of scirrhusities at the change of life, which remain quiescent through the remaining portion of life. This is especially the case where the tumour is seated towards the fundus of the uterus. If the disease is in the os tincæ, it partakes of the nature of external parts, and runs into formidable disease, as ulcer, fungus, &c.

The same morbid structures prevailing in the breast, very soon cling to the skin, and break out into all manner of formidable fungous ulcers, or real cancers.

The difference exhibited in the advance of the disease, in these parts so differently situated, and the more rapid progress of the scirrhus of the mamma to the formidable condition of cancer, I attribute principally to the mamma being more exposed in its situation than the ovaries. On this principle I have acted, and by endeavouring to convert the mamma, as it were, into an internal part, and to guard it from the changes of temperature and the influence of the atmosphere, I have been enabled long to retard the ulceration, and to heal it after it has begun. The manner of dressing is described below.

It is principally owing to the more external position and relations of the uterus, that its affections are more formidable than those of the ovaries; and that the os tincæ is the seat of the most painful and distressing maladies of that part.

The tubercles of the uterus, and the scirrhusities of the ovaria, being of the same class of diseases with those of the mamma, and the circumstance of position affecting the latter, so as to produce an earlier developement,—an important question arises, Are we sufficiently attentive to the condition of the ovaria and uterus, when consulting on the condition of the mamma, and about to decide on the propriety of operation?

Obviously it is not enough to ascertain the condition of the breast, and of the lymphatic glands; the state of the uterus must be

inquired into. We should question the patient, and ascertain if there be the irregular hectic; and we must inquire if there be pains of the hips and thighs, and tenderness of the spine, for these are symptoms which attend disease of the uterus. If these symptoms are present, an examination of the uterus should be demanded before operating on the breast.

Local Treatment of the Carcinoma Mammæ.

The late Mr. Cline was satisfied with covering the scirrhus breast with the soap-plaster; but it required all the influence of his authority to induce the patient to be contented with any thing so simple.

We all recollect the attempt of Mr. Young to cure cancer by compression. The idea was taken up in extraordinary ignorance; yet incidentally there was something not to be despised in the practice; I mean the covering the breast deep under bandages.

At the time of dressing, the breast is to be bathed with a large sponge and salt and water, tepid or agreeably warm. The salt and water strengthens the cuticle, and tends to prevent the skin ulcerating.

Or, if there be tenderness of the surface, make a lotion of extract of conium and warm water, and continue to bathe the breast for some time.

The breast being dried, do not let it be long exposed, but cover it with slips of lint, spread with a cerate composed of soap-plaster, or the emplastrum thuris, with a third part of the extract of conium. Put these slips over and across, covering the breast completely. Take care to leave the nipple uncompressed.

Over this put a piece of oiled silk, gumming it to the skin at the edges; then put on cotton wadding in great quantity, the more the better; a piece of flannel over that; and roll the breast, or support it without painful pressure by means of a broad bandage and shoulder straps.

[¹ Especially if the smell of the dressing be offensive to the patient or her friends.]

Put a turn of the roller round the arm to keep the elbow to the side.

If there be tenderness of the nipple, wash it with borax and spirits and water.

If there be superficial excoriation, as if the tumour were about to break into open ulceration, cover these with gold-beater's leaf.

If the dressing be carefully performed, it should be left three or four days.

Such a mode of dressing goes far to make the breast an *internal part*; it keeps it in a uniform temperature, and preserves it from all influence of the atmosphere.

Let it not be forgotten that, next to protecting the surface, it is

necessary to preserve the pectoral muscle below the gland at rest, by confining the arm.

A great advantage of this mode of dressing is, that it prevents the patient fingering and disturbing the parts.

For well founded reasons, I am averse to apply leeches to the mamma, especially habitually or regularly. Such application to the hemorrhoidal vessels is often necessary; but, for the very reasons that they are beneficial there, they are the reverse when applied to the breast.

But it occurs that the breast swells suddenly with great pain, and then leeches and fomentations are very necessary. Yet, even in this case, the leeches are applied with more advantage between the mamma and arm-pit, than on the prominence of the tumour.

When there is an *open cancerous sore*, a great variety of modes of fomenting, poulticing, and dressing, must be had recourse to.

If there be a deep slough, lint dipped in camphorated oil should be laid in the bottom of the sore, and over it a poultice.

The carrot poultice will remove the offensive smell. The fermenting poultice is very often preferred by the patient; and when well made, is an excellent dressing. A poultice made with the *brown wash*¹ of the hospital is good.

In common cases the best digestive ointment is one part of basilicon ointment to two of Turner's cerate, with a little finely levigated red precipitate. While this is put into the deep sore, the edges must be protected by the ceratum plumbi cum creta.

When the breast is thus dressed, it should be covered with the cotton as before, and gently supported.

[The mode of compression as advised by Young was tried in the Middlesex Hospital in several cases. It produced most distressing consequences to those who were far advanced in the disease, and great pain to all.]

*Example of a common case, in which the operation is proper.
The Operation minutely described.*

Mary Bacon, aged 47. Whitbread's Ward, December 31, 1823.

This woman is sent up from the country with a scirrhus mamma. A tumour, about the size of a walnut, occupies the right breast. It is deep-seated in that part of the mamma which is betwixt the nipple and the axilla.

There is another little tumour or knob, just underneath, and attached to the base of the nipple.

These tumours are to be felt, not seen; for on disclosing the breast, there is neither enlargement, irregularity, nor discoloration visible. The nipple is not erect, nor quite natural; neither is it

¹ <i>Lotio conii cum opio.</i>	℞. Extracti conii,	ʒiij.
	Opii duri contriti,	ʒj.
	Aquæ ferventis,	℥j.
	℥	fiat lotio.

much drawn in. There are no tubercles on the surrounding skin, nor enlarged glands in the axilla, or above the clavicle. The other breast is natural.

This woman is of a spare habit, and apparently delicate constitution; yet she has enjoyed good health, and has had nineteen children. She has come up to town with the intention of having the operation performed.

The necessity for it is obvious, and there is nothing against it. It is apparently a true carcinoma, in its first stage: and if the operation is to be successful at all, in the case of true scirrhus, that success is promised here.¹

Operation—January 2, 1824.—An incision was begun upon the side of the mamma towards the axilla. It was carried a certain way in a straight direction, and then round the areola on the lower side. The incision terminated at the edge of the tumour towards the sternum.

Where this incision began to deviate from the straight line, the second incision commenced, and inclined round the areola, at the upper part, joining the first incision at about two inches from its extremity.

During the operation, the patient entreated that the whole might not be taken away; but to this the operator could not yield, as, for good reasons, the nipple and areola are always included in the part removed. After these external incisions had been made, and the integuments a little dissected back, the tumour at the part next the sternum was separated from the pectoral muscle, lifted up and drawn towards the axilla.

The part next the axilla was separated last. The bleeding vessels were carefully sought for after the operation, and five of them secured. One artery was tied during the operation. The oozing of blood had entirely stopped before the parts were brought together.

Adhesive straps were used; over this dressing and lint, and a soft cushion of tow was placed over all; finally, a broad roller was put round the chest, with a scapulary over the shoulder.

January 3.—Notwithstanding the care which the operator took, that there should be no more hemorrhage, there is considerable oozing through the dressings. There is a slight degree of fever, which, however, arises only from what is vulgarly called the stimulus of the knife.

January 5.—The patient was dressed to-day. Considerable adhesion has taken place, and it would have been complete, but for a little blood which has oozed betwixt the lips of the wound. The dressing was made in the same manner as after the operation.

A little fretting of the skin threatens erysipelas.

Capiat haust. salin. eum vino ipecac. M. x. ter. die.

¹ gr. Calomel, gr. iv.

Conserv. Rosæ, q. s.

Ft. Pil. h. s. sumend.—et cras mane haust. domest. ℥ij.

January 7.—The cutaneous inflammation was caused only by the irritation of the strapping.

January 9.—The ligatures have come away, and the wound goes on prosperously. The woman is comfortable in her feelings, and happy that the operation has been performed. The tongue is quite clean, and the skin natural.—Dismissed highly satisfied.

Consultation on the propriety of operating in Carcinoma Mammæ.

At the same time that the surgeons of the hospital had determined on the propriety of operating in the preceding case of Bacon, the following came under consideration.

Sarah Shakestaff, æt. 30. A consultation has been held on this case.

1st, The first thing to be observed is her complexion. She has the cancerous countenance (which must be seen, it cannot be described).

2d, The nipple is drawn into the breast; another unfavourable circumstance.

3d, A solid scirrhus tumour occupies the breast, and the breast is dimpled in the centre by the retracted nipple.

4th, There is a hard tumour about the size of a walnut in the axilla; it has been there for two months. The tumour in the breast has existed for at least twelve months.

5th, She says that the pain is of a stinging or darting nature. Catamenia absent for a year past.

The surgeons are of opinion that no operation can be performed in this case. The reasons they assign are, that the filaments, which are thrown out from the centre of the carcinomatous tumour, must have extended their roots too far to be cut out. As to the tumour in the axilla, although it might be taken out without immediate danger, yet the disease must have gone beyond the apparent tumour.

Katherine Ferry, *an out-patient*. She comes for the advice of the surgeons of the hospital. She has a tumour in the breast very obviously carcinomatous. The nipple is retracted, and the skin of the pit around the nipple inflamed and moist, approaching to actual ulceration. Directed by this circumstance to examine the axilla, a gland is found there considerably enlarged.

These circumstances decide the consultants in advising that the operation should not be performed.

Mr. Bell made the following remarks on these three cases being read.

From these cases it may be inferred that it is only in the early stage of this disease (the true carcinoma,) that we dare promise success from the operation.

The practical difficulty is, to find the symptoms sufficiently marked to indicate the true nature of the disease, and yet to have the absence of those appearances which indicate that the filaments have extended too far to be eradicated.

For example, if there has been ulceration of the nipple, it is always attended, or immediately followed, by contamination of the glands of the axilla.

Again, the retraction of the nipple, if it be complete, implies that the filaments (which characterise the section of this kind of tumour,) must have stretched beyond the mamma into the integuments; and this may have happened although the skin feels quite soft and pliant.

The circumstance the most decisive against the operation, is the earthy-pale, unhealthy countenance which belongs to an advanced stage of this disease.

CHAPTER XXXIV.

OF THE DISEASES OF THE PARTS IN THE FEMALE PELVIS WHICH REQUIRE THE AID OF THE SURGEON.

[It is out of my province to treat of Midwifery, and yet the members of our public boards are inexcusable for rejecting examination on this important branch of practice, since they are established for the health and welfare of the community. In how embarrassing a situation the surgeon must often stand who is ignorant of midwifery,—how many and serious the mistakes into which he must fall. Many a time I have seen the surgeon proceeding to the extirpation of the mamma, without a question as to the woman's constitution, or the capability, on his part, of putting a question on the subject! I have found a surgeon employing rectum bougies for years, on account of an obstruction from displaced uterus! I have been called to puncture an ovarian tumour in the pelvis, and found it to be the projection from distorted spine! I have known a practitioner of note incapable of relieving a woman with the catheter, when the urethra was compressed, and unable to determine whether it was retroversion, prolapsus, or ovarian tumour, that compressed the neck of the bladder. I have never known an operator who was not ready at a moment's notice to perform the Cæsarean section, and yet had never reflected on what depended the danger of the operation, or if there were means of obviating these dangers.

Conceive the danger of a surgeon even performing the common operation of tapping an ovarian dropsy, without knowing the signs of pregnancy.

Sir Charles Clarke says, "I have a patient now who has been taking medicine for the stone. She has a tumour projecting from the anterior part of the neck of the uterus."

As I have often said, practise what department you may, but study

the whole; there is infinite danger in attending exclusively to the practice of medicine, or surgery, or midwifery.

I shall have but a few remarks to make on this neutral ground.]

Use of the Female Catheter.

Consider the peculiarities of the female urethra; short, direct, wide. What then should obstruct it? 1. It is obstructed in hysteria. 2. The bladder may have suffered from over-distention. [Turn to p. 171.] 3. It may be pressed on by the child's head retained in labour. 4. It may be pressed by the os tincæ in the case of retroversion. 5. The ovarium in a state of disease may have fallen upon it. 6. The diseased orifice of the uterus may press upon it. 7. Polypus of the uterus and procidentia may affect it.

In common cases, you have only to manage the introduction with some delicacy. The patient is in bed; the nurse places a pan or a urinal. You take the catheter as you hold a pen; the point of the mid-finger is a little beyond the extremity of the instrument. The hand under the clothes; the finger between the labia. You distinguish the prominence of the clitoris; and in a line directly under that you feel the slight prominence of the orifice of the urethra, and slipping the end of the catheter off the finger, it enters the urethra. In the woman who has borne children, the mouth of the urethra is lower, and just on the margin of the vagina or os externum.

[When the obstruction is from the child's head, or a tumour, &c., you alter the direction of the instrument. After it has entered the canal, you press the handle down upon the posterior perineum, and direct the point of the catheter upwards on the inside of the os pubis.

In the case of *retroversio*, you would do well to use a flexible male catheter.

This case of *retroversio uteri* was first explained by Dr. W. Hunter. You will find cases in the *Medical Observations and Inquiries*. I know it only by dissection. I went with an accoucheur to examine the body of a woman who had died undelivered. On touching the body, I said this was no case of pregnancy! And on opening the abdomen we saw the bladder, and not the uterus, and it extended above the umbilicus. The fundus of the uterus lay in the hollow of the sacrum; the os tincæ distorted the urethra, and pressed it against the os pubis.

You suspect this to be the cause of obstruction when the patient is three months gone with child; for then the uterus is of a size to occupy the pelvis, and extend obliquely across it.

I have found the diseased uterus lying thus across the pelvis, and the fundus adhering to the rectum and sacrum, and the os tincæ pressing on the neck of the bladder.]

The orifice of the urethra is subject to a fungous excrescence. It is to be treated with escharotics and strong astringents.

Enlargement of the Nymphæ.

The morbid enlargement of the clitoris or of the nymphæ requires the knife. In removing these, take their structure into consideration. Being vascular, and spongy and excitable, they are subject to bleed after the surgeon has departed, and much blood may be lost before means are found to arrest the blood. Therefore, I would advise that the operation should be performed as recommended in the case of hemorrhoids, p. 154.

Imperforate Vagina.

The nurse will bring you a female infant with the labia adhering. You may be induced to sit down with regular surgical apparatus to divide this unnatural union. On separating the parts for the purpose of a careful dissection, you find the surfaces tearing up! and that you may undo the union with your finger, or with the handle of the knife.

No doubt, if neglected, this may become a firm closing of the vagina.

But the imperforate vagina presents us a very different case. The defect is not discovered till the period of menstruation, and perhaps not then. I operated on a married lady who had lived four years with her husband; Dr. Merriman and Dr. Sweatman present.

[The usual symptoms accompanying menstruation, without the usual relief—the gradual accumulation in the uterus—and a certain degree of fulness in the lower part of the abdomen—ought, one might imagine, to indicate the imperfection, even in unmarried women. In the case alluded to, there was no such indication of distress, notwithstanding the cavities of the uterus and vagina were greatly distended with the accumulated menstrual discharge.]

The closure or septum is just within the vestibulum; it is firm, and resembles in colour the sides of the vulva. Introduce a catheter into the urethra. You perforate with the pointed bistoury, and there rolls out a matter like tar. You enlarge the opening so as to admit the point of the fore-finger; and now, taking hold of the membrane between the finger and thumb, you are not to be contented with opening the passage, but ought to cut it out in a circle.

The flow continues for many days, and perhaps does not become quite natural till after the period of the next menstruation. It is remarkable that the matter discharged does not become putrescent. It will dry like a cake of glue.

It is proper to use the bougie for some time after the operation.

[Be aware that girls of from five to eight years of age are subject to a disease in the external organs of generation—an inflamma-

tion of a deep dusky-red colour, attended with foul ulcers, and sometimes sloughing. There is great disturbance of the health accompanying this disease. Mr. Lawrence describes the complaint, and states his belief that men have been unjustly accused of abusing mere children, under the impression on the parents' minds that the child must have been infected with venereal disease.]

Procidentia, Prolapsus Uteri.

I have already hinted, that the uterus sinking into the vagina, or reclining, and forming adhesions, will obstruct the rectum, and may be mistaken for stricture there. In disease of the rectum in the female, you will examine also by the vagina.

The uterus falls down in consequence of relaxation of the vagina, and that occasioned by discharges, and consequent weakness. Therefore astringents should be freely used as injection, or introduced with soft sponge (remembering, however, that astringents improperly used may cause inflammation.)

As to the employment of *pessaries*, I am against their use. It is inconceivable how offensive the discharge is, induced by the lodgment of a foreign body in the vagina, and even from this cause the use of pessaries must be hurtful.

It is better to invent means of returning the parts within by pressure without; you may make compression with the T bandage, or the apparatus with a spring brought round from behind, as for the support of the prolapsus ani. But we encroach on the business of the accoucheur.

Polypus Uteri.

[Before you interfere with this form of disease, you ought to be thoroughly acquainted with the condition and diseases of the uterus, which is a very extensive department.

Consider, 1. The case of procidentia, the uterus sinking through the vagina; 2. The inversion of the uterus; 3. The case of mole or firm coagulum in the cavity of the uterus,—perhaps layers of successive flooding surrounding an abortion; 4. The diseases of the os tincæ and of the glandulæ Nabothi.]


The symptoms are not unfrequently mistaken, and the physician may be drugging a patient on account of profuse menstruation, when the cause, beyond the influence of medicine, is a tumour exciting the womb. The shortened interval of menstruation, the more profuse discharge, and of pure blood, is the condition which calls for examination.

You examine with the finger, and with a strong probe furnished with a ball. You take care to distinguish the prolapsed uterus. You feel for the orifice and the distorted lips of the os tincæ. You make sure to distinguish them from the polypus. You go round the tumour, carrying the probe between it and the sides of the va-

gina. You try to discover the neck of the polypus, and its place of attachment. You pass your probe beyond it into the cavity of the uterus, and you distinguish the neck of the uterus.

All this precaution is necessary, to prevent you from throwing your noose on the uterus, when you intend to include the polypus only.

The operation is this: take a stay-lace—twist into it a fine gold wire—with this you are to noose the polypus. There are two instruments to enable you to do this—a fine iron rod, with a firm handle, and the extremity forked, yet so as not to prick or hurt,—the other instrument is like to this in all respects, but at the end there is a ring, and on the handle pins to fix the ligature. These instruments are a little bent, to accommodate them to the convexity of the tumour.

You expand the loop of the cord on the ends of the fore and mid-fingers of the left hand; you insert them behind the polypus; and with the assistance of the forked instrument you carry the cord round and round the base or neck of the polypus. You next pass the ends of the ligature through the ring of the second instrument, and run it up so as to tighten the loop round the neck of the tumour; you push up and adjust the loop with the forked instrument; and finally draw it tight, and fix the ends of the ligature to the handle of the instrument. You let the instrument remain, and may have occasion to tighten the cord next day.  You are careful so to defend the instrument that it shall not, by some unpremeditated motion of the patient, be impelled upward to the injury of the uterus. Inject and wash the vagina until the polypus drops off.

Puncturing the Ovarium from the Vagina.

[Dr. Merriman has given cases of obstruction to delivery, by tumours of the ovarium sinking into the pelvis.

You will be informed by the competent authorities on this head, that obstructions which appear insurmountable to the delivery of the child, do nevertheless yield and disappear in the progress of labour in a very surprising manner. Nature is not easily baulked in her operations. This you must think of when employed to perform operations to admit of delivery.]

I have hinted that I was called to puncture the ovarium when there was no such tumour, notwithstanding three of the principal accoucheurs in London were in consultation. On examining for the purpose, I was confounded to find no *tumour*. On returning to the consultants, I declared there was no such impediment. "What," said our senior consultant, "not feel it; why it is as large as a Norfolk dumplin." "What, gentlemen," I answered, "is it possible that you have not recognised the prominence of the sacrum in a pelvis distorted in a remarkable degree?" They went and found it so. You perceive that the surgeon must sometimes exercise his

judgment as well as his dexterity. I had here the first authority for thrusting the trochar against the bone!

On another occasion I was carried down to Berkshire to puncture the ovarium, which, it was supposed, had descended into the pelvis. The lady was in the last month of pregnancy. I found on the side of the vagina a tense tumour; but feeling also fluctuation, I conceived the possibility of it being matter: and on examining the patient, I found it tense and full when she was erect, soft and almost disappearing when she reclined. This directed my attention to the spine, and, in short, I found the case to be a lumbar abscess. Enough then, to put you on your guard in examining tumours in the pelvis.

One thing more; these tumours of the ovaria are often too solid with fat and hair to lead us to expect much relief by puncture through the vagina.

Extirpation of the diseased Os Tincæ.

In the present day the uterus has been extirpated, and I fear this operation will be repeated. I say so, because I conceive the operation is not authorised on any just principle.

When I have seen the extirpated parts, they exhibited no just reason for the operation. The formidable disease of the body of the uterus does not admit of the operation, and, indeed, in every case the danger is extreme.

Excrescences from the orifice are the subject of operation, with more reason; for though, if the disease be malignant, it is impossible to make a cure by cutting off an open cancerous and fungous tumour, still symptoms may be alleviated by excision of a part, and tumours not malignant may be removed.

The operation is an unseemly and a cruel one. The tumour is seized by the hooked forceps, and drawn down, and the diseased part cut off; a considerable hemorrhage should be permitted. It will be stopped by styptics and the compress in the vagina.

On the whole, I do not recommend these operations. You cannot extirpate a cancer of the uterus, as some foreign surgeons pretend to have many times done.

Mr. Lawrence has most sensibly expressed himself on this subject.

Some Observations on the Cæsarian Section.

There are two cases in which this formidable operation may be performed; 1. When the mother at the full period of pregnancy dies suddenly; 2. Where the state of the distorted pelvis gives no hope of saving the mother by the sacrifice of the child.

When the mother is dead, and a movement to the last indicates life in the child, it might be imagined that it signified little how the operation is done. But it is obvious that it will be more readily

submitted to by friends, and performed by surgeons, if the mode of it does not necessarily imply the destruction of the mother.

When I have assisted in this operation it was performed thus: my position was to grasp the abdomen, to prevent the intestines protruding, as the tumour of the uterus should diminish. The operator (having taken care that the bladder was empty) made an incision in front, as close to the pubes as possible, for the uterus hung over; the incision included the margin of the rectus muscle. This was an unnecessary precaution, but its object was to have a fleshy and broad margin for the incision. The abdominal walls being divided, the surface of the uterus came into view. It was touched with the knife, on which it flew open, showed no sharp cut, but a circular opening, the fibres retracting in all directions. The incision of the uterus being completed, the operator insinuated his hand, burst the membrane, and seized the child's feet, and, somewhat perhaps too rapidly, delivered the child. The placenta had been attached low, and it rolled out as soon as the child was delivered.

My occupation was now an arduous one; for the woman immediately commenced vomiting violently, from the sympathy between the uterus and stomach, so that I retained the intestines with great difficulty, until the suture was completed. She died of hemorrhage from the uterus into the abdomen. The child survived.

I can have no hesitation in saying that the necessity for performing this operation may occur. It has for a long time been decided that, of the two lives, that of the mother and the child, the offspring is to be sacrificed to save the mother, in those dreadful cases where both cannot be saved.

But there occurs a case in which the mother cannot be saved by the operation of embryo-ulcia. It is needless to contest the question of the degree of distortion which absolutely prevents delivery. In the instance above alluded to, the distortion was such that the child's head did not present at all to the brim of the pelvis, nor could any part of the child be felt *per vaginam*! nor was there room to pass an instrument and the finger at the same time!¹

On such a case recurring, time and opportunity being given for the performance of the operation, I would recommend the following precautions:

1. That the incision through the abdominal walls should be made in a direction from the crest of the pubes obliquely outwards. The epigastric artery would require to be tied.

2. Press up the peritoneum,—a matter not difficult in the preg-

¹ Let it be remembered, that in a remarkable distortion from mollities ossium, the operator deliberating on what could be done, was surprised to find the head of the child descending! It appears that the bones had become softened in a degree beyond any thing I have seen or could have believed to be consistent with life. The distorted pelvis yielded to the force of the labour pains.

nant state of the uterus,—and reach the vagina or uterus under the peritoneum.

3. Getting at the vagina, or certainly the lowest part of the uterus, make a small incision,—introduce the finger,—dilate slowly: imitate in this the natural labour; there would be neither pain nor danger by delay.

4. Break the membranes, and if the action of the uterus should be as strong as I have seen it in the last case, permit the head to advance; if not, seize and deliver by the feet, as in the operation of turning.

[Would not such a procedure avoid the breach of the peritoneum, —would it not avoid the fatal hemorrhage which is consequent on the incision into the body of the uterus? Would it not give a better chance of recovery than by an incision into the belly of the woman?]

CHAPTER XXXV.

OF SYPHILIS.¹

Is there any experienced senior of the profession, who, having a son of eighteen or twenty, and that son having a chancre, that would treat him without mercury? No! there is not such an unnatural person.

This is our text, for to this the practical question should be brought.

As to the history of this disease, it is curious, but not essential to a right practice. We may observe, that the Greek and Arabian physicians were accurate observers and good historians. Could they have failed to notice a disease characterised as this is,—death through stages so horrible?

In the genitals, chancrous ulcers and *verruca*,—buboës in the groin,—wide-spreading deep sores,—upon the skin, yellow and livid blotches,—pyramidal scabs, and under them corroding ulcers,—pustules and ulcerated tubercles around the temples and forehead,—the bones of the palate lost,—the lips, eyelids, and nose swollen, distorted, and ulcerated,—the hair fallen,—the human features and the human voice lost,—and the unfortunate victim racked with pains in the bones, succeeded by nodes and exostosis. Could a disease so horrid be overlooked?

About the close of the fifteenth century, the disease became universal. In a single lifetime there appeared a hundred books upon this disease, and not an allusion to it before. It is of no consequence

¹ For the name, read the curious Latin poem of Jerome Fracastorius.

whether it was brought from America, or broke out in the dissolute camps of the French and Italian wars. The question must ever remain undecided, how it did arise. Was it from the broken skin coming in contact with a morbid secretion of the opposite sex ; which secretion was not of the same nature with the disease it produced : that is to say, not syphilitic ? or had it a wider origin,—did it proceed from, and does it ever attend a demoralized people indulging in promiscuous intercourse ? This question might be of some interest as touching the notion of the disease dying out, and of there being many diseases of venereal origin.

On this latter question it must be noticed, that, in the earliest author on this disease, sixteen kinds were enumerated. Mr. Abernethy should have gone back to this, when he was describing a new species of the disease. Are there in reality new diseases, or are the appearances which have given rise to the opinion to be attributed to other causes ? I must state to you the sources of so many adverse opinions.

1. Syphilis differs from all other diseases in this, that the milder the symptoms are, they are the more difficult of cure. 2. Again, you cure the symptoms prevailing for the time, without curing the disease. 3. There are stages, or a succession of symptoms. You combat the first, and the second, third, or fourth rise in succession. The specific for the disease is itself a poison, and gives rise to disease. 4. Both the disease syphilis, and the remedy mercury, in certain constitutions, and especially in scrofula, have formidable consequences. Then the constitution of the individual, the season and the country, give rise to new characters of the disease.

I might enumerate other peculiarities, the sources of a thousand errors and misconceptions, and all principally owing to the length of time the disease will lie dormant or drag on. A disease so chronic is easily influenced, though not cured. Philosophers will calculate the orbit of a comet from observation of a portion of its course. But the course of this disease is subject to too many disturbing causes, besides that our practitioner is not a philosopher. It is far easier for him to assert that he has got an extraordinary—an unique—a new disease to deal with, than to be trammelled with the knowledge of the old.

We seldom see a mismanaged case in which the patient has not been poisoned with mercury ; from this, various erroneous opinions spring. But in the hour I am writing, I see the disease in all its purity ! A gentleman presents himself ill in many ways ! “ Now, come let us be explicit and save time ; have you any idea of venereal disease hanging about you ? ” “ None.” “ You have taken no mercury ? ” “ None.” But he is quite out of health—wasted—pale—his hair falling off ; he is sleepless with pain in his bones, and on the outer spine of the humerus there is a very tender and protuberant ridge,—his tibia is tender, the clavicle rough. Now, my opinion is, that this gentleman is thoroughly poxed, and nothing is wanting but neglect to render him an object, such as we occasion-

ally see coming into an hospital; or such as I have described from the early authors in the first part of this chapter.

And the reason that we do not see those objects more frequently, is because the cure is so easy. A quantity of mercury is given, and given improperly, and then indeed we see a new disease.

But the principal cause of difference in cases, is owing to the constitution of individuals, joined with the peculiarly slow progress of the disease. We shall find arguments as we proceed.

The primary ulcer (chancre) is the same to-day with that described by Mr. Hunter,—the same with that described three hundred years ago. (What is the conclusion?)

When on the glans, it is thus: the first stage, that of pimple or pustule, is generally passed unnoticed; the alarm is from an itching; a small ulcer is visible; its surface has the colour and appearance of a slough, a cineritious colour, rather more yellow; by-and-by the edge is raised and hard; already it may, from this circumstance, be felt through the prepuce, especially if on the corona.¹

In this condition, the sore will remain sometimes long stationary, "as if waiting for the consent of the constitution." On the contrary, the surfaces may inflame rapidly, with increased discharge over the glans, and possibly phimosis.

When the chancre forms on the prepuce, there is inflammation earlier. The thickening is more distinct, for on taking hold of the foreskin between the finger and thumb, you will feel a hardness like a pea.

If the sore has formed on the outside of the prepuce, it will be covered with a scab.

☞ See that you distinguish a tear of the root of the frenum; it very much resembles a chancre in an early stage. When the chancre is really here, it produces violent inflammation. Remember, too, that the glans and prepuce are peculiarly exposed to excoriation and ulcer not venereal, and that, if you give mercury for these, you enter a labyrinth.

Accidents.—I wish to have a term that shall mark the varieties incidentally produced, not necessarily attending the primary ulcer.

The infection received from a subject in whom the disease is mild, hardly indeed attended with distress, will appear with unusual violence of symptoms in the newly infected. There may be much inflammation, pain, and irritation. There may be sloughing, bleeding, or mortification. Some of these peculiarities may proceed from the part which is the seat of the sore; more from the condition of the health.

For example, there is a *livid irritable chancre*, ragged on the

¹ Mr. Hunter has much praise from the critics for his description of chancre. Compare it with one of the original writers, *Vigo*:—Semper fuit cum pustulis parvis, interdum lividi coloris, aliquando nigri, nonnunquam subalbidi, cum callositate eas circumdante. See Howard. So *Marcellus Cumanus*.

edge, and in progress resembling phagedena, very irritable, and therefore attended with much swelling of the integument. This implies no new disease. You look to the individual: consider the season: you may find other sores or wounds partaking of the same disposition. (Turn to p. vi. Introduction.)

Mortification is an alarming occurrence; perhaps, in a few days, the foreskin and the whole member will be swolu and of a dark red colour; mortification follows, and a great part of the penis falls off in slough. This is not a bad *form* of the disease; it is accidental. You look for the causes in the individual; perhaps a soldier in cantonments. In that case, you consider the country, the exposure, the season, the food, the wine, &c.

In the end of summer 1818, I gave a clinical lecture on five cases. Two men who had slightly hurt their hands (one of those had only scratched his knuckle), were lying with their arms mortified. One man had lost his penis by mortification; another had a black spot on the prepuce, which threatened to go the same way; and one had lost both penis and scrotum, and was dying from the spreading of mortification extending to the belly. The conclusion was not difficult to draw: the season and the state of the house was the immediate cause of the mortification in all of them.

Phagedenic ulcer is equally an accident, and may proceed from a chancre, but also from a common ulcer, or a wound of the prepuce.

We see at least one fertile source of misconception, that the primary sore seems to vary, and to present the character of new diseases. We perceive, also, that the constitution exercises a most remarkable influence upon the sore; and we draw the conclusion, that it is of the utmost consequence to keep the patient in a favourable condition for the healing of the sore, and at rest.

Bubo.—An uneasiness and pain in walking is felt; then a swelling, and generally of one gland; the induration swells and obscures the gland. The skin reddens: it is a florid red: suppuration is perceptible in the centre. When the abscess gives way, the matter will appear in unusual quantity for the size of the swelling. The edge of the ulcer wastes, and assumes a venereal character; the matter yellow, the bottom sloughy, the edge hard.

But is it a venereal ulcer? Consider what other sources there are of a glandular swelling. Is it in the glands which belong to the penis? Is there a sore on the glans? Is there gonorrhœa? Are there piles or irritation at the anus? Has there been any excoriation on the thigh? Is the swelling in the lower order of glands? Are there several glands enlarged? Has he been using mercurial friction, and has he irritated the roots of the hairs of the thigh into pimples, &c. The bubo is equally subject to accidents as the primary sore; to irritation and excess of action; to rapid ulceration, phagedena, and sloughing. To which conditions the venereal virus is only the exciting cause.

Secondary symptoms.—This means constitutional disorder,

arising out of the local affection. It is the prevailing opinion that matter is absorbed. It may be that irritation and peculiar action are the means by which disease is propagated from the part to the general system.

The disease is ushered in by some general symptoms. If you ask your patient if he has considered himself in good health of late, he will answer in the negative. The pulse is quick, the skin hot and dry; he has palpitations or faintness, pains, and, as it were, a weight on his shoulders; and these symptoms are relieved by a sore throat or eruption.

The constitutional symptoms will appear in about two months, though they may be delayed by climate, season, temperament, or regimen; above all, they may be rendered both late and irregular by improper exhibition of mercury. On the other hand, the cold and wet of winter will accelerate the coming on of symptoms. Many a one passes the warm months in ease, to have the disease shew itself on the coming on of cold, irregular weather. The cold bath will develop the venereal sore throat.

[An opinion prevailed that, if the patient continued well for three months he was safe. I wish I could subscribe to this opinion, but it is not consistent with experience; were it really so, the whole matter would become exceedingly simple.]

Sore Throat.—The patient's attention is drawn by a prickling sensation in the throat on swallowing. The ulcer is deep in the amygdalæ, or in the soft palate, the sides of the arches. It is excavated, and sloughy, or, as you would say, foul. The matter is greenish, the edge abrupt. There is a dark redness on the palate around. There is little tumefaction. You cannot wipe away the secretion.

[1. There are ulcers of the tonsils in delicate constitutions, and lax habit. 2. See that you do not mistake viscid mucus sticking in the follicles of the tonsils for ulcers and sloughs. 3. There is a mercurial ulcer, but salivation and fetor of the breath will warn you against mistake. 4. In indolent tumefaction of the tonsils, with thickness of speech, there is sometimes coagulable lymph thrown out upon their surfaces. You will know this by the greater degree of swelling, and the absence of the excavated ulcer. 5. The throat is subject to phagedenic ulceration.]

Cutaneous affections.—Eruptions sometimes precede, often follow, sore throat. The skin and fauces are of the same class of parts.

The general distress is greatest preceding cutaneous eruption; headach, pains about the shoulders, dejection and languor.

The skin becomes mottled; this subsides, and there are small spots of the cuticle elevated; these are abraded; and there appear copper-coloured spots, flat, the size of a split pea. They are circumscribed and distinct, though sometimes they occur in patches. They present on the forehead, roots of the hair, the breast, and the inside of the arm.

The pustular venereal eruptions are more equivocal.

At an after period the glands of the face, of the cheek, *alæ nasi*, and upper lip, ulcerate. There comes a pimple, from which an ichor is pressed; it becomes a sore, the edges are high, within is a greenish slough, which cannot be cleaned away with lint. The cavities of the nose are stuffed; there come away pellets of hardened secretion; the smell is offensive: blood is discharged on the handkerchief.

The patient has now more evidently suffered in health; his complexion is sallow; if he was florid the colour is gone; his pulse is quick; he has shivering and wandering pains; his ankles swell.

Now, the affection of the skin is pustular, and crusts of all sizes form upon the head and face; and there are swellings of the periosteum over the more exposed bones. Nodes appear; the pains are aggravated at night. If still unchecked, a glairy or coagulable fluid forms between the bone and periosteum, and the bone becomes inflamed and carious. The pain now rises to delirium.

We have followed the course of the disease until it has taken full possession of the system: how slight the beginning---how strange and irregular its course---and how unhappy the consequences---distress and shame.

[It is many years since I conversed with Mr. John Pearson on this disease. We were in consultation on a gentleman on whom the attention of the country was then fixed. I could not control him; high duties, and a relish for society, called him abroad, while a sore was eating into the glans. Mr. Pearson said: "You know my experience in this disease; you are now in a condition in which you can be cured and effectually and entirely cured. But by your manner of life our treatment will be inefficient: the disease will slumber in you. Symptoms will appear from time to time, and these, like this, will be removed; but at length you will fall into a condition, over the symptoms of which we shall have no control."

We seldom see a gentleman exhibiting the effects of the last stage of this disease, and for very obvious reasons. Successive courses of mercury, ill conducted, exposure, and an irregular life, bring him to an enfeebled condition; and he has inflammation of lungs and consumption, or diseased intestines, and is wasted by diarrhœa.]

Such being the enemy we have to encounter, let us see what weapons we are to use.

The Treatment of Syphilis.

There are startling opinions rife amongst us. I lean on Hunter, Howard, Pearson, Cline and Cooper. I believe Mr. Abernethy was wrong in the matter of pseudo-syphilis, and that there is but one disease produced by impure connection, arising in a sore, propagated by bubo, going on to sore throat, cutaneous foulness, and disease of bones.

I believe Mr. Abernethy was wrong in other particulars; and

from the tenor of my lectures, you know the respect I entertain for him. He believed that the true venereal disease was necessarily progressive, and that a chancre did not heal; and that the manageable symptoms belonged to a new disease. But all the symptoms of syphilis may be palliated, nay, the *symptom* cured, and yet the system remain contaminated. His pupil, Mr. Lawrence, entertains just ideas on the subject.

Mercury.—Let us examine the edge of that weapon of defence. We will find it the most dangerous to wield that ever was put into the hands of a tyro.¹ A certain number of dozens of pills; a certain weight of mercurial ointment is used, and that is the whole rule of many practitioners. Mark, then, I beg, the poisonous effects of mercury, and that it induces disease. 1. That, by long-continued courses, it will debilitate and produce scrofula. 2. That, falling suddenly on the mouth, it will produce ulcer and sloughing. 3. That, falling on the bowels, it will occasion violent purging. 4. That, acting on the skin, the surface will become hot and itchy, exhibit papulæ with a suffused redness (mercurial erythema). 5. That its influence on the system will be marked by anxiety in the præcordia; a small intermitting pulse, pale, contracted features, languors, shivering, difficult breathing, and sudden death!

But use it with discretion and skill, and instead of these formidable effects, it proves the only cure of a multitude of evils,—a relief to pains which no opiates will assuage,—fills up and closes the deep ulcers, and restores a wretch otherwise without hope, and an outcast from society.

Before you put your patient on a course of mercury, take especial care that the case is made out, and that there is no doubt of the nature of the disease. No sooner have you commenced the course, than all distinguishing symptoms are taken away. No man, however experienced, can assist you with advice as to the propriety of continuing or interrupting the course.

You ought to inform your patient that his distress and pains will disappear, but that he must suffer to be again ill—ill from another cause, before he is safe: for, unless previously informed, patients will be restive, and take liberties as soon as they feel themselves well, which they will do perhaps within the first fortnight.

It is not the quantity of mercury taken by which you have to estimate your patient's safety, but the effect as counteracting the disease.

Remember that there are some constitutions so susceptible of the influence of mercury, that the most violent effects will be produced by a very small quantity.

Do not count on these violent effects being remedies for the dis-

¹ There stands a structure on a rising hill,
Where tyros take their freedom out to kill.

GARTH.

case; the action is too transitory to affect the disease, which we have characterised justly as very slow in its progress.

The disease of soft parts will be corrected more rapidly than disease of the bone. It has taken long to affect the bone,—it will take long before the antidote influences the morbid action in the bone.

Disease of the skin, or of the membrane of the throat, is easily influenced; not so the venereal inflammation of a bone.

In the old and confirmed pox, there is great difficulty in exhibiting a full course of mercury. The latent disease, as Mr. Hunter said, it is difficult to dislodge. Mercury does not destroy the latent “disposition,” which was what Mr. Pearson meant.

Another difficulty meets us when the treatment by mercury is prolonged. It is apt to produce a state peculiar to itself, and yet imitative of the symptoms of the original disease. This is the reason why we must often conjoin other remedies,—as sarsaparilla with a diminished dose of mercury, or the diet drink with rich syrup, and having to sustain the strength, whilst we continue the mercury in alterative doses only.¹

Mercury will sometimes not act, and you join the nitric acid to the plan of cure, or have recourse to some other preparation of the metal, as the oxymuriate in solution.

R. Hydrarg. oxymur. gr. i.

Ammon. muriat. gr. v.

Aquæ distillatæ, ℥i.

Fiat solutio.

Let him have a teaspoonful in decoction of sarsaparilla.

There is another peculiarity in the mercury, or rather in the constitution. It will not at all times and in all stages produce its expected effect. Your patient shall have the most unequivocal symptoms of syphilis, yet mercury will make them worse. You must have recourse to other means,—syrups, decoctions of sarsaparilla, nitric acid. You must send him to the country, and prescribe a milk diet; and when a certain time has elapsed, and other symptoms have appeared, the remedy which the constitution rejected will have the most beneficial influence, and a cure be obtained.

You inquire what is to be done when the mercury acts too powerfully and irregularly? You employ purgatives—you expose him to a dry air—you use for the mouth a wash of lemon juice, and laudanum and rose water—you mop the ulcerated cheeks with a solution of the argentum nitratum. When the action of mercury falls on the bowels, you use the chalk mixture, catechu and opium, or if of a more threatening and debilitating kind, this:

R. Argent. nitrat. gr. xii.

Opii, gr. vi.

Confect. rosæ canin. quod satis sit.

Misce—Fiant pil. xii. Capiat unam bis vel ter quotidie.

And when it acts as a poison, inducing anxiety in the præcordia, and an intermitting pulse, beginning with languor, and cold shiver-

¹ ℥i of the acid. nitric. dilut. to lb. i. of infusion of lemon peel sweetened.

ing, and difficult respiration, expose the patient to a dry cold air, and give a mixture with volatile alkali; and take care that in this condition he be not permitted to faint, which may be fatal. He is to be put on a course of bark and acids.

Of the cure of chancre.—It is a matter proved, that the primary sore will, in certain circumstances, and by treatment without mercury, heal. But it is as certain that, so treated, a sore throat will follow. Formerly they subdued the system too far; afterwards they were too remiss in this respect, and have trusted altogether to mercury. You do not purge him, and stew him in hot baths to reduce his strength, but you insist on confinement, a subdued diet, rest, and the antiphlogistic treatment; and with this begin to give the patient a mercurial pill night and morning, then two pills at night and one in the morning; or you order ʒi. of the mercurial ointment to be rubbed in.

You are to continue this treatment until the chancre is healed;—certainly until the peculiar characters of chancre have disappeared.

Do not use caustic nor escharotic, but soothing and anodyne applications to the sore. If there be excess of action and irritation, it has nothing to do with the disease, and it is to be treated as arising from an accidental cause, and to be subdued by the means obviously indicated. I am inclined to believe that much of “the new opinions,” much misconception and bad practice, has arisen from this. The chancre in an irritable constitution, or, excited by improper applications, is attended with inflammation, tumefaction, perhaps phimosis; and the practitioner, mistaking these for the symptoms of a violent or malignant form of the disease, pours in a destructive quantity of mercury, instead of having recourse to the *adjuvantia*, and limiting the mercury even on account of the violence of symptoms. Having once entertained this error, the next is the framing of an opinion that syphilis may be cured without the exhibition of mercury at all, seeing that these symptoms may be removed without it.

We have our best principles from Mr. Hunter; yet I must caution you against taking his work as a guide in practice. “I have,” says he, “dissected a chancre out, and the sore has healed up without any other treatment than common dressing.” This is very seducing language. Who would not rather have the sore cut out with the lancet, than suffer the confinement and privation necessary to the cure? But no one thinks of such a proceeding, and the objection to it is the same with that to the application of caustic to the sore.

Mr. Hunter also advises the sore to be dressed with mercurial ointment; mercury rubbed down with conserve—mercury with warm balsam—solution of blue vitrol—verdigris—calomel, &c. Decidedly this is bad practice. These irritating applications produce hardness. Mercury is given to reduce this hardness, on the supposition that it is venereal, and so your difficulties commence.

On the contrary, we must soothe the part, wash with a solution of white poppies, use as an ointment the ceratum spermaceti, with the aqua lithargyri acetata, and aqueous solution of opium.

When mercury has had its influence—when a milky whiteness appears on the inside of the cheek, and the cheeks take the impression of the teeth, and the gums are red, with a brassy taste in the mouth—and when, notwithstanding this, the sore is stationary, I would allow you to touch with Bate's lotion.

You must avoid using the knife on the prepuce, when your patient is under the influence of mercury.

Continue the remedy eight days after the chancre has healed.

Treatment of bubo.—The swelling of the gland is not considered as a constitutional symptom; yet it implies the necessity of a longer, fuller course of mercury, than the primary sore. If I say six weeks, I would rather that you were guided by the swelling and the surrounding hardness having disappeared.

You will remember the other sources of an inflamed gland; you will again notice the effect of motion and friction in keeping up a sore in the groin, and you will now perceive the danger into which the practitioner may run, of mistaking the cause of the continuance of the swelling, and therefore of unnecessarily loading the system with mercury.

In all the stages of the disease, you have this additional reason for subduing inordinate action,—that mercury will not have its effect during violent inflammation. It is the same law which is so unfortunate in tropical diseases; during the violence of vascular action, the mercury will not act.

It is in this manner that we explain the effect of leeching, whether in the case of swelling in the groin or swelling on the tibia!

If the bubo be in a state of suppuration when you first visit your patient, you do not on that account, as some have advised, defer using mercury. It may not prevent the bursting of the abscess, but it will tend greatly to diminish its extent and the discharge.

If a bubo be hard and indolent, there is no reason, while you pursue the mercurial course, why you should not also stimulate with rubefacients, or cover the swelling with stimulating plaster. If the swelling be actually in a state of suppuration, a blister will sometimes cause absorption.

The employment of the lancet is to be avoided.

Dress the open bubo with a mild ointment and a poultice.

When it becomes indolent, and the condensed and protuberant gland is covered with loose skin, other means may be had recourse to; or when fungous and projecting, caustic, sharp dressing, and compression must be employed. There is no danger of mistaking the effects of such means of cure for the symptoms of the original disease.


If such a sore, after yielding to the influence of mercury, should suddenly open and alter its condition, and spread rapidly, mercury is

not the cure, and should not be pushed. Nor ought you to forget that a mercurial phagedena is the worst disease of all.

I have often repeated to you, after Mr. Hunter, that mercury will produce scrofula. What then more likely to occur, than that, after the specific action of syphilis is subdued, through the influence of mercury, a scrofulous diathesis should supervene! and that you should have a scrofulous gland rather than a bubo to treat in the long run.

Venereal sore throat.—If, winter coming on, you should find your patient with a venereal sore throat,—if cold and wet does in him produce a venereal inflammation, it is the less surprising that the remedies for a common sore throat should have an influence upon the true syphilitic sore throat. There is abundant evidence that it has. The evidence is also cumulative that you ought, in conjunction with the mercury, to take the common means of subduing an inflammation in these parts.

[Do not be satisfied, when there is a deep ulcer in the palate, with less than a course of mercury properly conducted for six or eight weeks.]

Need I here remind you, that mercury will produce ulcer, and that, if your patient has been taking mercury, you must be on your guard against increasing or even pursuing it. The swelling of the gums, the disposition to salivation, and the fetor of the breath will inform you; and if these are present with a deep sore, you must change your remedies. Gargle with a wash of the muriatic acid; leave off all preparations of mercury, and give bark, wine, and opium. Remember that in scrofulous persons there is left a disposition to ulceration in the throat, and to superficial inflammation, and excoriation, which will continue for years.  The inflammation will be more of a raised efflorescence than the deep ulcer of syphilis. You will not treat such a case with mercury.

The ulcer being such as we have described, and going on rapidly and with a venereal character, your anxiety will lead you to employ some direct means of stopping the ravages of the ulcer. With this view, you use as a gargle the oxymuriate, or lay the gray powder mixed with honey into the chasm.¹ In desperate cases you may fumigate by cinnabar on a hot iron.

With regard to the *condition of the skin*.—Whilst mercury is the cure of the disease, take the other means which offer themselves; *e. g.* the warm bath—the compound ipecacuanha powder—or opium at night, especially when the skin is dry—or order a draught with morphia, and the antimonial wine.

¹℞. Hydrarg. oxymurat. gr. iv.
Solve in spirit. rectific. ℥ii.
Decoct. cinchonæ, ℥vi.
Mel. Rosæ.

Tinct. Myrrhæ, aa ℥ii et ft. gargarisma.

The pulv. hydrarg. cum creta mixed with honey may be laid with a hair-pencil into the ulcer.

You will find it difficult to say when the eruptions have disappeared; the spots will retain their colour a long time after they have ceased to indicate disease. It will be sufficient that their lively and peculiar colour has disappeared, and that no elevation of the cuticle remains.

You may wash the fungus that sprouts from under the scabs with a solution of copper, or of the nitrate of silver, and use the red precipitate ointment.

The swellings which remain at the end will require stimulating liniments, or the junction of iodine with the mercurial ointment.

The tincture of iodine has a beneficial influence after the mercurial course, or when there are reasons for pursuing it no further.

An abscess or a carious bone must be discharged by incision, and the bone taken away, if loose. But no advantage is gained by violence. The linimentum æruginis, and Bate's camphorated lotion, are common dressings.

✍ You will not continue your mercury all the time the bone is carious. After the disease has terminated, time must be given for exfoliation.

Again, in the exposed state of the bone of the nose, the dead bone will be felt, and the offensive discharge continue long after the syphilitic action has terminated. It is among the hundred errors committed in the treatment of this disease, that the remedy is continued so long as the offensive discharge continues; and it will never discontinue while the mercury is given!

To the swellings on the bones you use the camphorated mercurial ointment with the ung. hydriodatis potassæ.

By the long confinement and the course of mercury, your patient is like a hot-house plant, which a breeze may nip. The country and a milk diet, where it is possible, should be recommended.

AMPUTATION OF THE PENIS.

[This is a subject which should have been brought into the end of Chap. XXI; but from what I have to say upon it, it signifies little in what arrangement it is taken.

It has been my fortune to see this member amputated, when it ought not: also when it was of no avail to stop the course of disease.]

When to phimosis there is added a foul and acrid discharge under the prepuce, a crop of warts is produced. The foreskin being narrow, and the matter confined, the prepuce ulcerates at the back part; the glans projects through the gap, and the foreskin is turned off to one side. The glans being covered with ugly projecting warts, the whole mass appears in the form of the most malignant disease.

But if the prepuce be removed, and the warts properly treated,

there being no actual malignant disease in the case, the penis assumes its natural appearance.

[But I am bound to state, that the patient having submitted to amputation, the part has been handed to me as a specimen of cancer of the penis, when, on narrow examination, it was exactly what I have here described.]

The formidable carcinoma, tending to open cancer of the penis, begins in the glands of the prepuce; and irregular tubercles being felt in the prepuce, I would have no hesitation in recommending the removal of the whole integument.

But when the disease has taken hold of the glans penis—when the hard irregular integument projects tuberculated, everted, and curled, with a deep cancerous ulceration of the glans—I much fear it will happen as (I have always seen it) that the amputation will not be successful.

At all events, you examine the glands of the groin, and you feel the glands on the inside of Poupart's ligament. You consider the countenance before you determine on the operation. What you have to dread is the propagation of the disease to the glands of the groin. The tumour takes place some weeks after the operation. It ulcerates, eats deep, even to the arteries of the groin; or a string of glands indurated on the psoas muscle point out the further progress of the disease; and in the mean time, the patient, with a cadaverous countenance, is exhausted, and dies. Nevertheless, I shall describe what takes place in the operation.

The assistant takes the penis between his fingers and thumb, to be as a tourniquet. If he does not hold firmly, this will happen:—when the part is cut off, the corpus cavernosum escapes his hold, and contracts within the integuments of the scrotum. The surface bleeds very freely out of the bag of the integuments, and the operator is in much difficulty.

In this amputation, there is no necessity to save integument; the diseased part is cut off with a single motion of the knife.

If the assistant has held the stump properly, the bleeding surface is presented to the operator, and he takes up the vessels. There will be two arteries on the dorsum of the penis; two arteries in the corpus cavernosum, close to the septum; and there will probably be arteries in the integument, if there has been much disease and tumour of the prepuce.

But unless the surgeon thinks of these arteries anatomically, he will find himself engaged putting ligatures on the cells from which the blood continues to flow. When he has taken up the proper arteries, he must trust to compression for the rest.

A tube may be put into the urethra, and the remaining part of the penis compressed by the dressings.

After this operation the extremity of the urethra is apt to contract, and it will require the occasional introduction of a bougie to keep it open.

ADDITIONAL NOTE TO P. 24.

BURNS, EFFECTS OF RAPID CHANGE OF TEMPERATURE, &c.

Whilst there is life and reaction, a sedative is an indirect stimulus. The alterations of temperature are stimulants, whether the change be to heat or cold. For whilst the body has the inherent property of preserving a uniform condition of heat—of preserving its temperature during all the vicissitudes around it—a change of vascular action is a consequence of the alteration of temperature. If there be increase of heat, there is increase of circulation and transpiration; if there be diminution of heat, there is increase of action without evaporation, and heat is accumulated.

Admitting this, we perceive what a sudden change of heat must produce; that the heat of the room, and of the fire over which we indulge, will have severe, nay even fatal, effects on a person dragged from a snow-storm.

On the contrary, give the powers of the body time to do their office of accommodation, and a man will stand with impunity the heat of a furnace which will roast an egg. The experiments of Sir Charles Blagden, Dr. Fordyce, and others, have been more than confirmed by the workmen of Sir Francis Chantrey.

There is, however, a certain range of temperature, within which the healthy functions of the body are performed, varying with habits, and certainly varying in different animals, (in the human body the temperature is 98° Fahr.; 62° will be agreeable in the sick-chamber).

In extreme cold, the skin becomes pale, the surface rough (*cutis anserina*)—the blood impeded in the cutaneous vessels—the circulation languid—the powers of life fall low, and the part is *frost-bitten*. If it be not a partial influence, drowsiness, and an indisposition to exertion, follows; and if the person be permitted to sleep, he does not recover to sense and motion, but dies. The frozen soldier staggers on the march like a drunkard, and falls with all the powers of life exhausted.

The practical question is divided into, 1. What should be done when the whole body is torpid? 2. What should be done with a frozen part? In regard to the first, let there be no further expenditure of the animal heat. Stimulate to the production of natural heat by friction. Let the surrounding temperature be only a few degrees above freezing. But the covering the body in snow, and plunging it in iced water, seems admissible on no principle that I can perceive. 2d, The friction with snow, in the case of partial defect of temperature, is another thing altogether, for you have a

power to invigorate. The friction brings activity, and the snow prevents the too rapid influence of heat, which would be the effect of friction with the hand or with warm flannel.

The whole principle, then, is, to permit no sudden change,—to see that the cold shall not further debilitate,—and that the natural powers shall be called into activity instead of external warmth.

In starvation, in another sense, the principle holds; you would not give a meal of stimulating food to a man subdued by famine.

Chilblains is the minor degree where the same principle holds. Tingling pain and redness and itching, from coming too near the fire in frosty weather, or from heating yourself before going into the frosty air. In a greater degree the toes or heels are dark blue; and if not forewarned, there follow vesication, excoriation, and ulcers. It holds with the above reasoning, that immersion in cold water is good, because it permits a slow return of action to the natural degree of temperature. When the mischief is done, there are various applications, chiefly of a stimulating nature; spirits diluted, volatile alkali, spirits of turpentine, rubbed into the parts.

R. Liniment. saponis cum opio ℥ii.

Spirit. terebinthinæ . ℥ii.

Misce, fiat linimentum.

The pain of a burn every one has experienced, and the effect of its extension over a considerable surface every one can conceive: violent constitutional irritation, shivering, cold extremities weakness of pulse, dyspnœa, effusion on the lungs, sinking of the vital powers, convulsions.

Another consideration will suggest itself; a difference in the effect on the powers of life will arise, according to the extent of the surface inflamed, and according to the degree of destruction of the skin; for the skin being the most sensitive part of the whole system, when entire, being extensively inflamed, the injury is proportionally severe. It is this which makes extensive scalding, which violently inflames without destroying the skin (especially when over the breast), so frequently fatal.

The following are applications to burns: 1. Place a saucer of turpentine in boiling water, and with a feather continue to cover the surface. 2. Wine and laudanum, warm, and applied with a feather. 3. Extr. belladon. dissolved in water, and mixed with spermaceti cerate; prick and let down the vesicles, and apply the dressing, and cover all thickly with cotton wadding. 4. When there is slough, use the ungt. resinæ flavæ with turpentine. If slight, and the surface unbroken, dust with chalk, and cover with cotton.

Lime-water and milk, lime-water and oil, are favourite applications. There is nothing under heaven that Dr. Thompson and Mr. Cooper have not given as useful applications to burns. When I left the Middlesex Hospital, our assistants were using white lead paint; and the report was favourable.

Cordials and opiates are necessary to sustain the system.

When resolution is not obtained, then you have suppuration—extensive granulating surfaces. Do not apply preparations of lead to these large surfaces, but mild dressing, spermaceti, and chalk-dressing. Poultices may be required when the surfaces are irritable. When high spongy granulations are thrown out, they may be covered with chalk and calamine powder and compressed with slips of adhesive straps, or, at dressing, they may be washed with lime-water or tincture of myrrh, or touched with a solution of nitrate of silver. See *Ulcers*, p. 52.—*Mortification*, p. 23.—*Adhesions of Burns*, p. 10.

APPENDIX.

CONTAINING CASES AND OBSERVATIONS ILLUSTRATIVE OF THE TEXT.

OBSERVATIONS ON HEMORRHAGE.

(*Being Notes from the Author's Clinical Lectures.*)

The peculiar excellence of clinical instruction is owing to the state of preparation of the student's mind to receive an impression.

Sitting here, you do not feel that I am speaking to you of things that may occur, by some remote chance, years hence, in your own practice; but, on the contrary, you see my anxiety, and partake of it. I particularly allude to the subject of hemorrhage: you have to-day seen the bleeding returning after amputation, notwithstanding every precaution: and yesterday, before you had left the hospital, you found I was called back to tie the femoral artery, owing to secondary hemorrhage taking place after the operation for aneurism.

As the accident occurred during the visit, you must all have partaken, in some measure, of the panic of the attendants, and the agitation of the patient, whose fate was impending whilst a pupil compressed the artery at the groin. You are prepared to understand the truth of the observation, that a surgeon, to be expert and active, must previously, with deliberation, have studied the principles which are to guide him in these operations. Boldness, bodily activity, and even a knowledge of anatomy, will not avail him on such occasions, unless he be directed by correct principles.

I may commence the subject of hemorrhage as I have heard it many years ago by my brother.

"Would you know," says the celebrated Guattani, "how I was inspired with love for my profession and enthusiasm in study? I will relate the manner of it very willingly, for in truth certain accidents which struck my imagination early in life were the cause. First, a bailiff, who had been shot with a pistol in the bend of the arm, was laid in the hospital of the Holy Ghost; where, for seven days, his cure proceeded with every favourable sign: but, would you believe it? on the morning of the eighth day, when I went to visit this man, the attendants met me and told me he was dead! This unaccountable and sudden death induced me to dissect the body! I found the side of the artery open, and the eschar, which the ball had produced, partly adhering, partly separated; no bigger than a grain of corn: it was by the sudden yielding of this eschar that he lost his life! Almost on the same day, another, whose artery had been pricked in bleeding, died of the hemorrhage, without even an attempt to save his life! Another, whose aneurism was in the ham, had a caustic applied to it, and when the eschar fell off, he bled to death! Another still had his aneurism opened with an actual cautery, and immediately expired through loss of blood! To these dismal scenes, which I myself have witnessed, what numbers might I not add from the consultations and writings of others." He then told us of the case of the butcher, who died suddenly from a wound of the thigh, and which he witnessed whilst a very young man. From such examples, my brother was urged to investigate with zeal the diseases and injuries of the arteries, the nature of aneurisms, their structure, and the best methods of curing them. I believe Sir A. Cooper has also some remarkable occurrence which he relates as having attracted him to the study of our profession.¹

I myself may describe to you a scene which has just happened: it tends at least to remind you how unexpectedly we may be called upon to act.

I was coming home late at night, or rather when it was morning; the streets deserted, and the gas lights seeming to shine for the exclusive enjoyment of watchmen and women of the town. What occurred to me might well have suggested the description given by Defoe, of London, in the time of the plague; when, as he went through the desolate streets, he heard a woman, who had lost all her children, calling from her window, "death, death!" As I turned round into one of the squares, a window was suddenly raised, and a lady screamed out, "my husband has cut his throat, and is bleeding to death—will nobody bring a surgeon?" You will allow it was singular that at such a time there was an hospital surgeon passing beneath her window. I rushed into the house, but was admitted with some difficulty; the people of the

¹ We suppose our lecturer here referred to the case of John Love, which happened forty-three years ago. See Sir A. Cooper's *Lectures*, edited by Mr. Tyrrel, vol. iii. p. 198.

house being alarmed, and naturally afraid of admitting improper persons. I made my way to the drawing-room, and here I was met with a new obstacle; for the lady, when she saw me, and knew who I was, embraced me closely, beseeching my assistance, yet holding me so that I could not move. At last I threw her from me, and going into the bed-room, found her husband lying on his back, the blood streaming from his neck. I immediately caught hold of the vessel in the angle of the wound. After having secured it between my finger and thumb, I looked round for further assistance. Instead of finding my usual assistant, (my friend here, the house-surgeon, to whose attention we are so much indebted,) I was somewhat puzzled when I saw one who had on a large, shaggy, white great coat; an old hat, with broad brim upon his head, and a red night-cap under it; a beard of a fortnight's growth, and a chequered shawl around his neck. "Sir," he said, "I am off my beat; I hope you will have the kindness to answer for me why I have left it." I found that it was the watchman who was my assistant; he had followed me up stairs without my noticing him. I satisfied the old man that I would readily explain for him the occasion of his being off his beat. I was obliged to wait for some time, holding the bleeding vessels between my fingers, until some medical assistants arrived with ligatures and needles. I was much relieved when an old house-surgeon of this hospital, Mr. Tuson, made his appearance, with proper apparatus; and to him I resigned the care of the patient. The arteries were tied; the wound was then sewed, and properly done up.

It is thus, that having once entered upon the study of our profession, no matter what may be your intentions about practising only some particular branch of it, it is incumbent upon you to study every thing relating to hemorrhage. Being a medical man, if an accident require sudden and prompt assistance, and you happen to be near, all the bystanders turn to you, and call upon you to afford the necessary aid. I may here repeat, that there can be no true presence of mind unless you have studied with care the most essential of all subjects—the surgery of the arteries.

Tying the carotid.—In connection with this subject, you have a case where the carotid artery was tied. This leads us to reflect upon the difference of the effect of tying the main vessel of a limb and the carotid. The carotid artery was here tied on account of the tumour termed *nævus*. You have seen this disease in its different stages, during the short part of the season that is past. It occurred, in one case, in the neck of a child, and you saw how the assistant-surgeon operated on it, by passing the long hare-lip pins under it, and surrounding its base with a ligature. This is better than cutting out the diseased part with a knife in such cases. To have cut this tumour from the side of the throat would have been attended with great hemorrhage. Besides, by the mode which you have seen, more inflammation is produced, and more compression

at the same time ; whereby there is a greater probability of destroying the root of the tumour by condensation.

This is the disease which, in its aggravated form, is the aneurism by anastomosis of Mr. John Bell. The second case is of that kind. You find a child with a soft woolly tumour, having a red spot on its most prominent part : this tumour is before the ear, behind the angle of the jaw, and extending to the cheek—that is to say, it is so entirely incorporated with bone, blood-vessels, and nerves, that you can neither operate with the knife nor include it in ligatures. For this disease, the carotid is tied.

But before I speak of the propriety of that operation, I shall endeavour to answer the question that has been put to me—viz. What is it that is so formidable in this apparently simple tumour ? This tumour very often appears as a stain or coloured spot on the skin at birth, and gradually it assumes the size and character which you have seen,—an irregular soft swelling, of a bluish colour, from which you can squeeze the blood as from a set of cells or vessels. You have observed the mulberry-like projection on the surface : it is through it that it bleeds ; for that soft and vascular projection not only bleeds when touched, but often bleeds profusely and periodically. This tumour, troublesome and dangerous when thus making its progress to the skin, is doubly so when it makes its way inward. Thus I have known it on the cheek make progress to the cavity of the nose, and, incorporating with the Schneiderian membrane, bleed till the patient was blanched like wax.

Now, with respect to the propriety of tying the carotid artery for such a tumour.

[At this part of the lecture, one of the surgeons requested Sir Charles Bell's opinion on a case of strangulated hernia, and the pupils went to the operating theatre. The lecturer promised to resume the subject at the next meeting.]

The subject resumed.

You will find it recorded, that a pulsating tumour of this kind, in the orbit, was cured by Mr. Travers by tying the carotid artery ; and a similar case is related by Mr. Dalrymple of Norwich. These were the facts which influenced the consultants upon the case of the child to whom I now refer, and in whom the carotid artery was tied. There was a bluish tumour, soft in texture, obviously containing blood, having no coagulum, no irregularity, nothing of the appearance of true aneurism, but altogether of the character of *nævus*. It was around the angle of the jaw, before the ear, near the throat, in that situation in which you could not extirpate it with the knife. Then came the question as to the propriety of tying the carotid ; and you find that the voice of the consultants determined upon its being done. Well, I confess that I am against it ; and now, if you choose, my reasons may come in the form of an apology why I am against it. Supposing that this sort of

tumour were an aneurism—supposing that the term which my brother has given to it were correct, then the operation might be performed; supposing, however, that this growth is not an aneurism, but a tumour, then I hold that it is not correct so to operate; because in aneurism you tie the artery, stop the force of the blood flowing through it, produce coagulation, and finally a cure. But there is something more required for the destruction of a tumour. What is the definition of a tumour? It is not enough to say that it is composed of matter foreign and different from the common texture; we bring into the definition of a tumour the action that is producing it. A tumour has a disposition to secrete certain matter, or to build up a certain structure. We cannot, by merely retarding the force of blood, alter that disposition; and if we do not alter the disposition, the force of circulation will certainly, after a time, be restored through the inosculations. Being then of opinion that this is a *tumour*, you see the course of reasoning in my mind, and why I think that the tying of the carotid artery will not be effectual. As strengthening this opinion, some of you may recollect a patient brought in with a pulsating tumour on the side of the head, in which the temporal artery had first been ineffectually tied, and then the carotid with no better success. You perceive that we must return to the subject of inosculature.

You will require me to say, why is it that a part remote from the heart is as plentifully supplied with blood as a part near the heart? Because there are two powers in operation—the heart's action, and the arterial action; and if the part be remote from the heart, it has the greater arterial power influencing it, proportioned to the diminished power of the heart. Here then the physiological fact comes in explanation of the circumstances of practice. When you tie the main artery, a thousand inosculations take upon them the office of that artery, and presently you will find that the blood runs into the main artery below your ligature. It does so in the common operation for popliteal aneurism, and if time be given these inosculations will enlarge, and at length the circulation will be perfectly restored. Now, in the head, you know that we have two carotid and two vertebral arteries, and not only are these four arteries taking the place of what you term the main artery in a limb, but if I may use so poor an expression, nature is solicitous that the vessels on both sides should inosculate with unusual freedom. These considerations, I must confess, diminish my hopes of success from tying the carotid in this case. But you will yourselves notice the fact—and it is a most important one—that already the tumour is considerably diminished; and let us wish and pray that it may not be half diminished, but altogether absorbed, and carried away.

[Sir Charles Bell, recurring to this case in the succeeding lecture, observed, that he was again called to a consultation on this child, to determine on the propriety of operating on a similar tumour situated on the opposite cheek. The consultation determined

against using the knife. "I take blame to myself," said he, "for not having noticed this tumour on the opposite side before; it would have been an additional motive against tying the carotid; for, if stopping the course of the blood on one side should be effectual in diminishing the tumour, the force of circulation directed circuitously to the other side, should be equally powerful in adding to the turgescence of the tumour there."]

Secondary Hemorrhage after tying the Carotid.

The next practical question which we may, with all propriety, entertain, regards still the freedom of inosculations, especially between the arteries of the head. There is no occasion for the formality of a case being drawn up; for the whole important circumstances which I have to refer to are before you. A gentleman, in a state of irritation and temporary derangement, stabs himself with a penknife under the ear. He is brought into the hospital, and the bleeding has ceased. It appeared subsequently that he had struck the artery. I have known a similar occurrence:—An unfortunate lady resolving to destroy herself, in a state of great depression of mind, takes the volume of our system of anatomy which treats of the arteries; she reads the account of the carotid, and carefully noting its situation, and feeling its place with her fingers, she puts a small penknife directly into it. She was found in the morning hardly sensible, the room deluged with blood, and herself deprived of motion on the opposite side of the body. The bleeding had been so profuse, the arterial action so reduced, that time was given for the formation of a clot where the artery was punctured; the parts closed in the course of the deep and narrow wound, and a pulsating tumour formed. You will perceive the slight difference between this case and that of a true aneurism of the carotid with regard to operating. The carotid artery was tied by my brother. The incision was made of two or three inches in length, upon the edge of the sterno-cleido-mastoideus muscle; the platysma myoides was divided; and the main artery tied: the operation was effectual. See, then, the necessity of carrying the principle with you. How was this operation successful? Because, although the tumour was occasioned by the puncture of the artery, yet it had all the characters of true aneurism; inasmuch as it was a small, circumscribed, pulsating tumour, resembling that which takes place at the bifurcation or division of the carotid. Had the wound not closed, had the puncture of the artery still bled, the rule of practice would have been very different.

I am very desirous that you should understand the difference between true and false aneurism, and also that you should be aware that what is termed *false* aneurism may be in its circumstances so like a *true* aneurism, that you may operate upon it, as in the case of this lady, in which my brother operated, by tying the main trunk of the artery remote from the tumour. You have, I hope, under-

stood, that when you tie the artery in a common case of aneurism, for example, of the ham, the blood is not altogether stopped, but only retarded in the tumour; so that it coagulates. So free, indeed, are the inosculations, that were you to take off the limb below where you have tied the artery, you would find the blood springing from the trunk of the artery. *A priori*, will not the current be similarly restored in the vessels of the head, where you are not tying the principal artery, but one of four arteries into which it is, as it were, subdivided, for the purpose of equalizing the circulation in every part of the brain? Now, to return to this man, who stabs himself with a penknife. The vessel did not bleed in the hospital. Whilst here, he lay under my name. After two days he was carried out of the hospital. Hemorrhage comes on after he is carried home, and the trunk of the carotid artery is tied; the hemorrhage returns, and he dies. This is the whole history as connected with our subject; and there is no occasion to dwell upon it. These are the important facts, and am I not borne out in saying, that it would have been better had this patient remained in the hospital? Certainly I am. And let me tell you how you should treat such a case. You are not to tie the carotid, but, if possible, the artery at the point wounded, and above as well as below the wound. If you look to Mr. Abernethy's works, which I hope you often consult, you will find the case of a man who had his carotid artery torn by a bull's horn, which entered under the angle of the jaw, and you will, in the detail of that case, understand all the difficulties of taking up the vessels in a wound of the neck. He put a ligature round the carotid, to act as a tourniquet—he drew the ligature, sponged out the wound, and sought for the bleeding orifices, but in vain. He undid the ligature, that he might see the jet of blood; but instead of that, the wound filled with blood, and he could see nothing, and he was constrained to finish the operation by drawing the ligature upon the carotid. Now, I say that this is wrong. What you have to do in a similar case is, either to enlarge the wound, or to make an incision in the neck low down upon the anterior edge of the sterno-cleido-mastoideus, carrying it through the platysma myoides, that you may insinuate your finger and thumb under these muscles, when, without opening the sheath, you can lay hold of the vessel. Having laid hold of the artery, clean out the blood from the wound, and try to find the orifices of the arteries: you can then open the finger and thumb, and let a jet escape: notice where it comes from, and in the instant, by closing the fingers, stop the blood: by this means you are enabled to find the bleeding orifice. If it be the great vessel, tie it above as well as below the wound. You know that if the artery be opened in the thigh, and you tie it above the opening, the blood in half an hour will come from the lower part, so free are the inosculations; and, indeed, if the secondary hemorrhage be delayed so long as half an hour, it is only in consequence of the extreme exhaustion of the

patient. Will the same thing not happen also in the neck? Remember the rule, then, and the reason of it—to tie both extremities of the bleeding vessel in false aneurism, and in the wounded carotid. As to the carotid, what can you expect from tying it below only, but secondary hemorrhage by returning blood. In Mr. Abernethy's case, the patient died soon after the ligature of the artery, from the loss of blood which he had suffered: had he lived, he would have had secondary hemorrhage from the internal carotid, by the circuitous vessels.¹

On wounded Arteries of the Fore-arm.

The education of our assistants, the house-surgeon and assistant house-surgeon, and I may say the surgeons in private practice in the neighbourhood of this hospital, deprive you, in a manner, of the opportunities of studying this subject; for you know, I presume, that bad surgery makes a better ground for a clinical lecture than correct practice. Distressing cases of wounded arteries do not come before you, because our young men are anatomists and diligent students, and they not only know what to do, but how and when to act. With the cases that I am now to place before you, you may contrast many that are upon record; and of these you will find an abundance in my brother's works. In that great work (which, if you have not perused, you know little of the interest which your profession is capable of exciting,) you will read of the horrors which are consequent on ignorance of anatomy and of timid conduct, or of ill-advised operations; where principles have been lost sight of, or rather, we should say, never learned. When an artery has been wounded, where the surgeon has been ignorant of the anatomy—where he has, therefore, been all abroad as to what to do—where ineffectual compression has been used, and consequently the blood has been driven into the cellular membrane—a most distressing and difficult case is presented, even to the most intelligent and active surgeon: for with the ineffectual operations and pain the inflammation rises, and the cellular tissue is injected with serum, in addition to blood; so that, at last, when the patient presents himself to the surgeon, there is unusual difficulty in detecting the bleeding orifice of the artery.

Another prefatory observation is, that, in consequence of the aphorisms of practice being established, you have none of the difficulties to contend with that they had who have preceded you; and therefore you ought to feel grateful to those who have laboured so effectually to establish the right rule of practice.

Sir Charles then read, from the house-surgeon's case-book, this case of

¹ We have an interesting case of the rupture of carotid aneurism into the throat, where Mr. T. A. Robertson put a ligature on the trunk with success.

Puncture of the Radial Artery.

"Charles Bartlett, æt. 21, a shoemaker, came to the surgery, with a wound almost exactly in the middle of the fleshy part of the forearm, about half an inch in length, rather towards the ulnar side of the arm, apparently not in the direction of either artery. The lips were nearly adherent, but on pressing on the sides of the cut a little clotted blood escaped: it appeared, however, of slight importance. The patient was told to go home, to poultice the wound for a night, and return the next day to have it properly dressed. However, about eleven o'clock at night he returned, having lost four or five ounces of blood; but the hemorrhage had been stopped by a tight bandage. We now questioned him more particularly about the history of this accident, and it appeared that he had received the wound three days ago, by a sharp pointed knife having been thrown at him in a *lark*"—(I hope this is the patient's expression, not the taste of the narrator); "that he had lost much blood at the time, and had gone to a chemist's, who strapped up the wound and stopped the bleeding; that on the two following days the bleeding had burst out afresh, and had been stopped in a similar manner; and that the chemist now told him there was a large vessel wounded, which it would be necessary to cut down upon and tie. On undoing the bandage, a small stream of arterial blood flowed from the wound; the wound was enlarged by a longitudinal incision; the blood appeared now to come from above and below, in a more considerable stream, and seemed as if it came from the interosseal artery, yet no wound ran between the bones. Some coagulated blood was now pressed out from a deep part of the wound next the radius. The blood then came in large quantities, and evidently from the bottom of this wound, which led in a direction towards the radial artery; it was easily stopped by pressure on this artery above and below the part wounded. The external edge of the wound being more than an inch from the artery, it was found necessary to make a regular dissection for the vessel. He was therefore put to bed, to await the visit of the surgeon next day, a compress being placed on the artery above and below the wound, which completely commanded the hemorrhage.

"When the surgeon saw him, he would scarcely believe that it was the radial artery, and not the ulnar artery, that was wounded; the latter seemed, from the direction of the wound, so much the more likely to have been injured. The compresses were removed, but no blood flowed. He desired that the arm should be kept raised, a cold lotion applied, and that he should be sent for if the hemorrhage returned. None appeared till four o'clock, when it again burst out. The tourniquet was put on, and the surgeon sent for. He having convinced himself that it came from the radial artery, cut directly down upon the artery, and connected his incision with the wound. The two flaps thus formed were turned back, and, after a little careful dissection, the artery was exposed, and the na-

ture of the wound in it proved just such as was anticipated. It was punctured in such a manner as to divide one-third of the circumference, and the retraction of the elastic coat, and the contraction of the muscular fibres, gave it exactly the appearance of having had a piece cut out. The tourniquet was now removed, and the vessel compressed above and below. The artery was divided at the puncture, and both ends tied at the distance of a few lines from the ends. The parts near the wound had been too much exposed and separated from the surrounding parts by the dissection and the injection of the cellular membrane. The wound was dressed; in five or six days both ligatures came away, and the wound soon healed by granulation."

(1.) This is a case coming the nearest of all to such as I have described, where mischief has been occasioned by imperfect compression; and I offer you the following remarks upon it:—

First, "the blood came from above and below." That to you, as anatomists, will not appear remarkable, when you recollect the free inosculations between the radial and ulnar arteries, through the superficial and deep-seated palmar arches: but it has been imagined necessary that the anatomist should trace the inosculations, to account for the blood returning so freely from the lower part of the artery of a limb. Not at all; in the flesh of the thigh, the shoulder, the arm, and indeed every where, there are sufficient small vessels—vessels which are exceedingly active, capable of high excitement and increased activity—to account for the flow of blood from the lower orifice; which, indeed, takes place, in certain circumstances, from all arteries, wherever divided. It has been stated in some of our books,¹ which, in other respects, are excellent authority, that it is only necessary to take up an artery, in the arm for example, above the wounded part; but in this case you perceive that there was an immediate necessity for tying the artery above and below the wound. Even if the lower extremity does not bleed, yet, if you take up the artery only above, you are almost certain to be called to a secondary hemorrhage; and there is such a welling of blood from the wound, that you have difficulty in deciding whether it comes from the failure of your ligature or from the lower part of the artery, and you are under the necessity of putting down a compress most probably within the wound, thereby occasioning great inflammation, tumefaction, and a tedious cure; all of which may be avoided by taking up first one end of the artery and then the other, so that there is nothing left in the wound but thread, and no particular excitement.

(2.) My next observation is, that when an artery is punctured and does not bleed, as was the case here, it is exactly what you are to expect. You are called to a patient who has suffered suddenly by hemorrhage—perhaps blanched by loss of blood; you ascertain by this circumstance that a vessel has been actually wounded, but

¹ The lecture was delivered in 1823.

now it does not bleed. You are thrown off your guard, you go away, and you receive a second hurried message that there is another hemorrhage. What then is to be done, when, from the circumstances of the case, the direction of the wound, the quantity of blood lost, you think the artery must have been struck, and yet the vessel does not bleed? One thing you ought always to try—and that is, to compress below the orifice, that is to say, more remote from the heart; and if the vessel have been only wounded in the side, or punctured, you will, in all probability, find that the hemorrhage recurs—that the blood being prevented from going down the artery freely, passes out by the wound.

(3.) You must also consider whether there is any thing in the position of the limb. If a man be engaged in a struggle, and the point of the knife enters through certain muscles, the moment the arm is changed in position, all these surfaces shift and lie over the wound, and the track of the wound becomes oblique and irregular; so that a coagulum is found in the interstices of the part and around the artery. It is well sometimes to study the position of the part when wounded—to place the limb in that position by which you ascertain the track of the wound through the several parts, and leave the passage free for the exit of blood.

(4.) There is another circumstance, not to be explained on mechanical principles. An artery bleeding stops from exhaustion, and after a time the hemorrhage again returns. I do not pretend to explain it, but such is the fact, that there is an impulse, an excited action, in the artery to resume the circulation; and sometimes this is marked by pain in the part. I have sat watching a patient, and known when to bestir myself and put my finger on the compress, from the pain striking down the limb; the pain producing an increased activity of the vessels, and that being a harbinger of a new breaking out of the hemorrhage. Thus it seems to be a law, that a vessel having exhausted itself, shall after a time recover and resume its hemorrhagic action. These are the circumstances that throw you off your guard, and sometimes induce you to leave a patient when he is in imminent danger of a return of hemorrhage.

(5.) The next observation upon this case is very important. You will observe that the incision to find the vessel was made in connection with the wound. That practice is quite correct, because we know very well that we have cases on record where the surgeon has trusted entirely to his knowledge of anatomy, and has said, "I see where the artery has been wounded, I will cut down upon it;" whereas he has cut down upon the side of the vessel not wounded, and therefore has not discovered the puncture, and much unnecessary dissection, unnecessary pain, and destruction of the parts, have been the consequence. Trust to anatomy as much as you may, dissect for the artery according to your knowledge of the parts, but take the assistance of the wound itself. Either pass a probe, or your finger, through the wound, and make the incision to communicate with it; so that when the artery bleeds, it will

pour the blood into the wound formed by the incision, and you will have less difficulty in ascertaining the point whence it proceeds.

(6.) The next observation is upon a very important and curious point: the artery appeared as if a piece were cut out. This explains why an artery does not heal. When an artery is struck, it contracts in one way, and retracts in the other; that is to say, the elasticity of the parts causes retraction, and muscular action induces contraction, so that the wound gapes; and it has no tendency to heal, because the edges are turned out. This I have seen in a way in which I could not be mistaken. When the artery of the arm has been wounded with the point of a lancet, I have seen it appear as if it were torn largely; and so the narrator states here, that it appeared "as if a portion had been cut out of the artery."

The artery was divided, and both ends taken up with a tenaculum; that is the easiest and the best way. By this means you avoid diving with the aneurismal needle, and the danger of passing it across the ulnar nerve, if it be the ulnar artery on which you are operating. If the vessel be only wounded at the side, I think the best plan is to divide it altogether, to pick up one end and tie it neatly, and then pick up the other.

The second case is that of

Division of the Ulnar Artery.

"Ellis Hayward, æt. 36, came to the hospital with a gash across the wrist, made by a piece of sheet-iron falling upon it. It had bled profusely, but had been soon stopped by winding a piece of broad tape tightly around the arm. He was faint from the sudden loss of blood, though it appeared that he had not lost much. When the bandage was removed no blood flowed, though the cut crossed the course of both arteries. The radial artery was seen distinctly pulsating in the wound, but was uninjured; the ulnar was completely divided; both ends were distinctly visible in the wound. The extremities were not involved in any clot, but were pulsating strongly, and considerably retracted, and so contracted, that not the slightest aperture was visible in their centre, nor a drop of blood flowing from them. Meanwhile a little artery of the skin was pumping away from the lower lip of the wound. The ends of the divided artery were very easily distinguished by the touch from the divided tendons and nerve. The two ends were then separately transixed with the tenaculum, and tied, the wound dressed, and a splint and bandage put on the arm to keep the wrist slightly bent. He was sent to bed, and the arm kept wet with cold lotion. In the evening he was flushed and feverish, with a strong frequent pulse, and much headach.

"He was ordered a dose of calomel, and the haust. salin. c. magnes. sulph. ziss. et vino ant. gtt. xxx. 4tis horis.

"Sept. 13th.—In the morning he was still very feverish, the

headach severe, and pulse very strong. He was therefore bled to eight ounces, which relieved him. The bowels were opened, and the medicine continued. In the evening he became more flushed and feverish, and the medicine was ordered to be continued every two hours.

"14th.—He was much better; purged; the wound uniting by granulations; the ligatures were twisted; compresses and splint reapplied. Fever again in the evening.

"15th.—In spite of care to prevent any matter being confined, a little pus can be squeezed out of the wound, and there is a slight blush around the wound; the fever, however, is less. He is a great deal reduced by purging and antimonials; no headach.

"16th.—Slept well; much better; more pus in the wound; restrictive compresses necessary above the wound, and very light dressing; only sufficient bandage to fix the splint.

"17th.—Both ligatures came away to-day, being the fifth day; both have been regularly twisted at each dressing. Half-diet and porter.

"18th.—Tendon of the flexor carpi ulnaris, and palmaris longus, sloughy.

"19th.—Made an out-patient."

1. The first point to which I would call your attention in this case, is the retracted and contracted condition of the artery, and the hemorrhage not recurring. You will distinguish this case from the next, for here the artery was cut across by a piece of sheet-iron, which I suppose had not a very sharp edge. You will always find, that if an artery be touched with a lancet, or opened by a spicula of glass, the injury being less, it bleeds more freely than if it be divided by a coarse instrument. In the latter case the contraction and retraction is greater, as well as the general injury to the coats of the artery; and the disposition to form coagulum is greater. You observe that the divided ends in this case were discoverable by the touch; that is just the consequence of the combination of contraction and retraction giving a degree of rigidity to the vessels, which enables you to distinguish them from the surrounding soft parts.

The third case is

Division of the Radial Artery.

"Ann Twyford, æt. 28, came to the surgery on the 6th October, with the blood dripping fast through the rags that had been hastily wrapped round a wound of the fore-arm. The wound had been received by the hand slipping off the bar of the window, in the act of pulling it down, and so thrust through the glass. It was about ten minutes after the accident that she walked into the hospital. She had lost much blood, and was getting faint, and the pulse was running very rapidly. The arm was grasped above, and the bleeding stopped. The flexor carpi radialis, and the palmaris lon-

gus, and part of the superficial flexor digitorum, had been divided. The outer end of the wound terminated just over the course of the radial artery, so that it was necessary to prolong it a little to get at the vessel. *The lower end* of the artery was the first to bleed when the pressure was removed. After it had been secured, the upper end, which had retracted most, was picked out and tied likewise. The ligatures were slightly twisted, and the wound dressed as described in Hayward's case. She was sent to bed, and had some opening medicine.

"The 8th and 9th.—Wound dressed; looks well; ligatures twisted.

"The 10th.—One of the ligatures came away.

"The 11th.—The other ligature came away, this being the fourth day after the accident.

"The 23d.—She is still in the house, but would be better at home, as she seems to suffer from the air of the hospital, having twice had diarrhœa and a blush around the wound."

1. Connect these two circumstances together; the artery is divided by a piece of glass, and you observe the wound is bleeding all the time, and the blood is oozing through this compress of cloths. This is the character of the wound, in opposition to the last case, where the artery had been more bruised, and confirms the observation I made, that the slighter the injury to the artery, the more freely it bleeds. This marks the distinction in regard to different kinds of wounds—lacerated, bruised, and incised. You are aware that a limb may be carried off, and no blood lost—that is, the artery is drawn out and injured, so that a coagulum of blood is formed in it. I remember, when I first came to town, being in the society of some of the most eminent men, and the conversation turned upon this very subject. I took the opportunity of remarking, "you are considering the matter too mechanically; if an artery be torn it stops bleeding. If I amputate a breast, and the vessel spouts out, and I take hold of it with my forceps, turn it round, and twitch it, it ceases to bleed; nay, if I even take hold of it with my forceps, and squeeze it hard, the same effect is produced." "Oh, then," said my friends, "the reason is this: when an artery is torn, the inner coat being more brittle than the others, is divided into shreds, and they act as valves, so that the bleeding is stopped." That was undoubtedly an answer to my assertion, but it did not convince me; and I went down to the dissecting room, exposed the radial artery, put a strong probe under it, and tore it asunder. I then opened it, and examined it particularly, and found that although the coats had been torn, no such laceration of the inner coat as converted the shreds into valves had taken place; therefore my first position was a correct one. It is not a mechanical cause, but an effect upon the living property. You destroy the life of the vessel, or injure it to that degree, that it no longer exercises its influence in preserving the blood liquid, and it signifies not whether you twist, tear, or bruise the artery, the blood ceases to flow from

it. When the principle of surgery is fairly laid down, and established in the pupil's mind, there is this happy effect, that he is not at once moved to wonder and carried away by new facts, such as this new method of twisting arteries instead of tying them.

2. Now here is the point much talked about at the present day—the torsion of arteries. There are none of my old pupils but must know what this torsion means. It does not mean that any mechanical change has taken place on the tube, whereby the blood is stopped; but that all injuries, whether from the presence of a compress, or of a ligature, or the death by gangrene, tend directly to produce this result—to cause the formation of a clot, in consequence of the relation established between the liquid condition of the blood and the healthy and natural influence of the arterial coats being destroyed.

3. One remark more on the necessity of twisting the ligatures. In several of these cases the ligatures were twisted; and observe what that means. If you take up an artery, separate the ligature, and cut off the ends near the knot, leaving only one end, you cannot twist it, you must wait for the process of nature throwing it off. You may have observed from a late operation of cutting off the ligature from an artery, that it is not always easily performed, especially when there is only one thread.

My practice has ever been, not to cut off one end of the ligature. If the ligature be left quite free in the wound, the separate threads may be entangled among the granulations, and so retained for too long a time; but if you take the two ends, make them parallel, twist them, and lay them down, they do not interfere with the granulations, and are not entangled. On the third day you have an opportunity of twisting them a little more; and from the third to the fifth day they come away without the necessity of pulling upon them. The first object is not to allow the threads to be connected with the granulations; the second is to have an opportunity, on the third or fourth day, of tightening the knot without pulling; whereas, if there be but one ligature, the only means of taking it away is by pulling, and you can easily conceive what may happen.

The next case is

Wound in the Ulnar Artery.

“Charles French, æt. 30, a coachmaker, on the 8th of October wounded the ulnar artery with a chisel. It bled most furiously; but he immediately commanded the bleeding with the thumb of the other hand, and came running to the hospital.

1. It is remarkable, indeed, how little pressure, if properly applied, is effectual. You see a wound bleeding, and every body hurrying to stem the hemorrhage, putting cloth over cloth, whilst the artery seems to be working with the force of an engine; but when you expose the proper bleeding point, and press upon it with the weight of the finger, it is effectual. I could illustrate this fact

with many curious instances, showing how men very high in our profession have been mistaken in regard to the force of an artery. Into this error they have fallen from seeing the force with which the blood is splashed from an open wound, even during their compression at the groin or above the clavicle; and because they have not had occasion to notice the very slight pressure of the finger that stops the blood, when placed directly on the face or side of the bleeding vessel. (The case proceeds:—)

"When he removed his thumb the blood spouted out violently; and not being easily commanded with the hand above the wound, the tourniquet was put on. The ends of the divided artery were buried in the ragged muscle; the upper one was picked out and tied, but there was some difficulty in recognising it, for it had been so obliquely divided as not at all to look like an artery: *the mouth being flat and expanded, instead of round and contracted.*"

2. The commentary being resumed, the lecturer observed,—That is remarkable; we have just heard it stated in the former case, and I dare say accurately, that an artery divided across was retracted and contracted; but here being divided obliquely, a totally different appearance was presented. It was expanded.

"The tourniquet was now loosened, to find the lower end more easily, and blood came from it in powerful jets."

3. So that here again you see the rule is confirmed. The upper end of the artery was tied, and the lower end began to bleed.

"This lower end was drawn out and tied, the ligatures gently twisted, the wound brought together with strapping, and a splint put on to prevent motion. On the fifth day the ligatures both came away, having been twisted at each dressing.

"Oct. 14th.—Nearly healed. An out-patient."

4. There is one circumstance which I beg to notice, and which escaped me in its proper place. You will find in some of these cases, that it was possible to compress the artery above and below the wound; and that being done by an assistant, there was no blood in the wound. But you must not always expect to do this; if there have been bad treatment at first, the cellular membrane is injected with blood, filled with extravasated serum, and then it would be impossible, even by a tourniquet, to stop the blood, and certainly it cannot be done by compression with the hand. It is only when there is no tumefaction that the pressure of the thumb above and below decidedly and firmly can be effectual in stopping the bleeding.

Lacerated Scalp.—Abscess.—The artery opened by the lancet.

The next case is—"A man with a lacerated scalp. He had an abscess formed in the temple; this was opened with a lancet, but some bleeding followed: it was stopped, however, with a compress for a time. The bleeding returned on the two or three following days, as absorption took place below the compress. At length the

wound was laid open; but the vessel could not be laid hold of by the tenaculum, but a small cut was made across the direction of the vessel; the wound remained open, but no more hemorrhage occurred."

Here is another circumstance in confirmation of what we learned from the other cases, that so long as a vessel is kept entangled and stretched, so long it will bleed from time to time; but being divided, the hemorrhage ceases. If there be bleeding from the temporal artery which you cannot arrest, divide it, and it stops. In bleeding from the temporal artery, if you cut it across you do not get enough of blood for the same reason, and therefore it is your aim to open it at the side only, in correspondence with the principles shown above.

I must once more remark, that these cases which have been properly treated by surgeons acquainted with the anatomy of the arteries, stand in remarkable contrast with others—not only with such as are on record, but it may be with those which may hereafter come under your care; for if a wounded artery be neglected, or improperly treated in the first instance, or if the blood be confined by the closing of the outer wound without securing the bleeding vessel, a very different scene presents itself, and your difficulties are much greater than you would suppose from these narratives.

Case of Foreign Body in the Trachea.

Sept. 1.—Mary Waters, æt. 9, was admitted into the hospital at nine o'clock this morning, with symptoms of suffocation. The report given by the friends was, that yesterday afternoon, being in school, and eating a plum, the child laughed, and was reprimanded by the mistress, who gave her at the same time a slight tap on the cheek; at that moment the child was sensible that the plum-stone had got into her throat. She was immediately seized with a difficulty of breathing, which has continued, with occasional severe attacks, ever since. A probang was passed into the œsophagus, and an emetic was given to her, before she came into the hospital.

It was evident that she required immediate relief. Sir Charles said that he slipped, unobserved, to her bedside, so as not to disturb or frighten her, for the purpose of examining her manner of breathing. She lay with her head raised high; she was restless, shifting her position, and tossing her arms; her chest rose high; and her nostrils were dilated; the sound of her breathing was hissing, husky, and impeded—it was in sudden gasps.

Having collected what tubes, probes, and forceps, were likely to be of use, the child was laid on pillows, placed on the table so that her position was inclined, not horizontal. This was done for two reasons—because a person breathes with difficulty in the horizontal posture—and, because it permits the blood in the wound to flow outwards.

An incision was made through the integuments an inch and a half in length, the centre being opposite to the cricoid cartilage. The thyroid and guttural veins were seen turgid; it was not possible to avoid them, and they bled freely. Continuing the dissection on the fore-part of the trachea, a small artery, the thyroidea anastomotica, was divided, and the wound bled considerably, so that the incision into the larynx was delayed a few minutes. The point of the scalpel was then thrust into the membranous space between the cricoid and thyroid cartilages. The child did not appear relieved, or only in a very slight degree, by this opening.

"My disappointment was now considerable. When I had done this operation before, the relief was immediate; no sooner had the point of the knife penetrated the membrane than the harsh sawing sound of the voice ceased, and the air came *siffling* through the wound; and when the end of the scalpel was used to hold apart the sides of the slit, and a quantity of mucus was discharged, the breathing was composed and easy."

The probe was passed upwards through the glottis into the pharynx, but nothing foreign was found interrupting the passage. The probe was then passed from the wound in the larynx down into the trachea, with every precaution, lest the foreign body might be thrust downwards by it; but nothing was to be discovered there. At this time the breathing was worse; the child's colour was darker, and a degree of insensibility prevailed. A portion of a large gum catheter was passed down into the trachea, and retained there, and the child's face and neck were bathed with cold water. The breathing became sensibly easier, and the freshness of colour returned to the cheeks and lips. The tube being withdrawn, further attempts were made to discover the stone, but without avail. Sir Charles at this time thought of putting the child to bed, but, resolved to leave nothing undone, he explored the passage once more. He felt the pharynx with his finger introduced into the mouth. He then passed the catheter by the wound through the chink of the glottis, and examined the sacculi laryngis; he then sounded deep into the trachea; and now he thought he could feel a roughness more than belonged to the cartilages. He, therefore, enlarged the incision downwards, and having bent the end of a probe so as to make a little hook, he passed it down into the trachea; by means of this, he succeeded in catching the edge of the stone, and brought it to be visible in the wound; then, with the small dressing forceps, he extracted it. It was half of the stone of a plum, and it had lain with its rough convex surface towards the concavity of the tube.

Immediately after the stone was withdrawn, the child opened its eyes and looked about, apparently with the conviction that the thing was accomplished. Nothing could be more striking, during the whole of the operation, than that a child so young should have so perfect a notion of the necessity of something being done for its relief, and that it should remain so submissive.

The wound was dressed superficially, and the child was put to

bed, breathing freely—to the great delight of those present, for it had been abundantly apparent that it was an affair of life or death.

Evening.—The child is perfectly quiet, and has slept a great deal.

Sept. 2d.—She is remarkably well; she speaks low, and complains of hunger. She breathes at present with perfect ease, and has done so ever since the operation. Leeches have been applied to the neck, and she has had some laxative medicine.

Sept. 13th.—The child is running about, and is quite well; but the wound is still open, and the granulations projecting. The zinc lotion is ordered, with compression by adhesive strapping.

Sept. 23d.—The wound is healed. Sir Charles said, that the father, with the child in his hand, came running after him as he left the hospital to return thanks. When he said to the father, "I am distressed that the child has not recovered its voice;" he replied, "It was only her shyness; she speaks as well as ever she did in her life."

Case.—Jeremiah Kentish, aged 60, a labourer, was admitted on the 23d October with general anasarca, his legs and thighs being more swollen than the rest of his body. His respiration was difficult, and attended with a wheezing sound, audible at some distance. He complained also of cough, and of inability to lie down in bed; and stated that during the preceding night he had been nearly "choked." His pulse was hard, but not full. His bowels were reported regular; his urine scanty, though he had a frequent desire to void it.

He declared that the swelling came on suddenly, only five or six days before; that at first his face was so much swollen that he could scarcely see; that he had no previous illness, except a recently slight shortness of breath; and that he knew no cause of the attack.

16 ounces of blood were directed to be taken from the arm, or more, according to the effect of the bleeding; and 8 ounces from the chest by cupping.

4 grains of calomel to be given immediately; and a senna draught four hours afterwards.

24th.—He was bled from the arm to 24 ounces, with very little relief to his breathing. He now says that he lost a pint and half of blood the night before his admission. His bowels have been thoroughly purged. Urine plentiful, acid, and with a pink sediment. The anasarca has almost entirely disappeared. He is now sitting up in bed, breathing with great labour, and with a loud stridulous noise, which accompanies both respiration and expiration; he refers all his uneasiness to the larynx, and to the ensiform cartilage. He swallows with difficulty, and every effort of deglutition excites a fit of choking with cough. There is no morbid appearance to be seen in the fauces. He has expectorated a small quantity of viscid yellowish mucus. Every part of the chest sounds

well on percussion, and the murmur of respiration can every where be heard, almost drowned, however, in the laryngeal noise.

He vomited freely soon after swallowing a scruple of ipecacuanha. This was followed by no improvement.

12 ounces of blood to be taken by cupping from the back part of the neck.

3 grains of calomel to be given every three hours; and $\frac{1}{2}$ of a grain of the acetate of morphia immediately after the cupping.

During the afternoon the steam of hot water was inhaled for some time, and twenty leeches were applied near the larynx.

In the evening the difficulty of breathing increased still more, and each act of respiration was attended with a loud croupy sound: his countenance was now anxious and ghastly, and his pulse was less firm. It was Dr. Watson's opinion that he would probably not survive the night, unless the operation of tracheotomy was performed, and that his general condition was such as to afford good ground for hoping that his life might thus be saved. Between eight and nine o'clock, he sent to request Sir Charles Bell's assistance, who immediately attended at the hospital. Mr. Joberns and Mr. Arnott were also present; and all agreed upon proceeding to the operation forthwith.

Although the patient was placed in a bed at the further extremity of the ward, the crowing sound of his breathing could be heard before entering. Upon approaching him, he was seen sitting forwards, moving with restlessness from one side of the bed to the other, and throwing his arms about, as if seeking for some new place of support. His countenance was pale and expressive of great anxiety, and his lips were of a livid blue colour. His shoulders were in continual action, being alternately elevated and depressed to the utmost; and the prominent larynx moved up and down in a remarkable manner, corresponding with the laboured heaving of his chest. He spoke with sudden, and as it were, convulsive efforts, earnestly expressing how thankful he should be to have the obstruction of his breathing removed, and said that in every other respect he felt easy, being free from pain except at one part, pointing with his finger to the lowest part of the larynx.

It was remarked how very short the space between the larynx and the sternum was, and that when the larynx was drawn down by the action of its muscles, there was scarcely half an inch between the upper part of the cricoid cartilage and that bone.

The operation was begun by pinching up the skin over the space between the thyroid and cricoid cartilages, and then dividing the fold thus made with the knife. Two small arteries, which threw out a stream of blood more than two feet, required to be secured by ligature. After dissecting a very little, the point of the knife was thrust into the membrane which joins the fore-part of the thyroid and cricoid cartilages, and the blood in the wound showed by its frothiness that the air-passage was opened. The longitudinal

slit which was thus made, was enlarged by cutting with the bistoury sideways; and after this was done, it was attempted to introduce a silver canula into the trachea. But as soon as the instrument entered the larynx, a dreadful paroxysm of suffocation was the consequence: the patient gasped, struggled, and drew his breath with a moaning sound, occasionally interrupted for some seconds, as if he were on the point of ceasing to respire altogether; and it was a considerable time before he could be restored from this attack, so as to submit again to the operations of the surgeon. It was next attempted to keep the slits of the wound apart by introducing a catheter wire, previously bent upon itself, into the opening; but another paroxysm of suffocation, more alarming than the former, and lasting a greater while, was immediately produced; and the interrupted and vain attempts to express his distress with words, the laborious heavings of his chest, the perspiration starting in drops from his face and brow, all showed the intolerable nature of his sufferings, and how impossible it was to retain such an instrument in the wound. Finding it thus impracticable to preserve a tube within the trachea, it was resolved to remove as much of the membrane which surrounded the opening already made in the larynx, as would permit the air to have a free passage into the lungs. Upon commencing to do this, it was astonishing to every one to what a depth the larynx was withdrawn, it being not less than an inch and a half from the surface of the wound. What principally, however, created a difficulty in the object proposed by the operator was, that the inner membrane of the larynx had become so extremely irritable, that whenever it was touched, however slightly, by the hook, the blades of the scissors, or any other instrument, a fit of coughing and an attack of laborious breathing were excited. Besides this, the larynx had a continual rapid movement upwards and downwards, (resembling the incessant rising and falling of the piston of a steam-engine at work,) and thus the depth of the larynx, the extraordinary irritability of the mucous membrane, the constant movement of the windpipe, together with the filling up of the wound with blood, as quickly as it was sponged away, all conspired to make it an operation of great difficulty to remove the angles of the membrane that were left. Another circumstance was observed deserving of attention, since it prevented respiration being performed through the orifice in the larynx: at each inspiration, the lips of the opening, which were seen to be expanded during expiration, became completely shut; and this was obviously consequent upon the thyroid and cricoid cartilages being drawn, by the action of their muscles, more closely together during the act of inspiration. Sir Charles Bell remarked that the spasmodic action, producing this shutting of the orifice, even caused the cartilages to pinch the point of his finger: it was from observing this fact that to some of the witnesses of the operation it appeared indispensably necessary to have a tube inserted into the windpipe. The cricoid cartilage was so hard, that it was supposed to be ossified: and whenever the

bistoury or strong scissors were employed to cut a piece out of it, fresh paroxysms of suffocation were produced. Several loose portions of the membrane were removed from the orifice in the larynx, and also those loose portions of the cellular membrane which were in danger of being sucked inwards during respiration were snipped away. Two catheter wires were then employed to hold the integuments apart: this was accomplished by doubling each of the wires, and forming their bent extremity into a blunt hook, resembling that which is sometimes used for holding the eyelids separate in operations upon the eye: one of these hooks being inserted on each side of the exterior wound, and the wires being bent round and fastened at the back of the neck, the surface of the windpipe was kept freely exposed. When this contrivance had been applied for a little, the breathing became greatly improved: and as an indication of the relief which the patient had received, he fell sound asleep. The crowing sound continued, which proved that his breathing was not altogether performed through the wound. An assistant had to be placed behind the bed-chair to prevent the patient's head from nodding forwards in his sleep, which he had already shown deranged the apparatus in the wound. The pulse was 93, and of good strength.

3 grains of calomel to be taken every two hours.

25th.—He passed a tolerably good night, sleeping a good deal at intervals. The aperture is smaller by the swelling of the soft parts. The respiration is carried on chiefly through the wound, but with labour and hissing, and occasional expulsion of viscid mucus. Last night a small portion of his powders was observed to issue at the wound; and the same thing has since happened upon his swallowing milk. He can swallow liquids only; and he experiences some difficulty, apparently, when they are in the act of passing through the bag of the pharynx. The sound over the chest, on percussion, is good: some large crepitation is heard by the stethoscope. The pulse is smaller and wiry. His bowels have been once opened. He is to continue his medicines, and to take arrowroot and milk from time to time.

Vespere.—He is much more comfortable: a metallic tube has been introduced into the trachea, through which he respires easily. His breathing is attended with but little noise. He has an urgent occasional cough, which is relieved by expectoration of tough mucus, partly through the tube and partly by the mouth. His bowels have been opened five times. His pulse is above 100, small, and sharp; his tongue is clean.

Opil, gr. $\frac{1}{2}$, statim; et adde sing. pulv. *Opil*, gr. $\frac{1}{4}$.

26th.—He has passed a good night, sleeping a good deal. The pulse is more tranquil and natural. His tongue clean and moist; his countenance is greatly improved; he has had three stools. An opiate enema was administered. In other respects he is the same as at the former report.

27th.—He has had a good night. He speaks better, but he does

not breathe more easily through the natural passage. His gums are tender, and he has the mercurial fetor. The calomel is to be omitted.

28th.—He is going on well, and his countenance is more natural. A larger tube has been inserted.

29th.—He is improving: the tube has been out for about an hour, and he breathes easily through the wound, which is suppurating. When the opening is closed, he soon begins to be distressed; though he seems to breathe better through the natural passage than he did. The fits of coughing have been less frequent and less violent, and the expectoration less viscid. He asks for more food. The act of swallowing is more easy, but it still produces a little coughing; and a small quantity of the fluid which he takes still passes occasionally by the wound. The pulse is 82, of moderate strength; the bowels are open; his gums are very tender. He is to have three eggs a day, beat up with his milk.

30th.—He has passed a bad night, with much coughing and expectoration. The tube, by some misunderstanding, has been left out since yesterday morning. A portion of his liquid food still appears occasionally at the wound. The bowels are open; his gums tender; the pulse as before. The tube is to be immediately replaced.

31st.—He has been more comfortable since the tube was replaced, and seems to be much in the same condition as before its removal, except that his pulse is rather more frequent.

Nov. 6th.—The tube has been out since the 3d, and he has continued to breathe comfortably through the aperture, which is contracting. He breathes partly through the mouth, and can bear to have the wound closed for a little time without inconvenience. His gums are still tender. He sleeps well; his bowels are regular; his pulse is good, and his appetite keen. Occasionally a small portion of his food shows itself at the wound. He swallows much better, and seldom coughs after doing so.

16th.—He breathes through the natural passage, and the opening is completely closed. His pulse is 95. He is somewhat hoarse, and says he has a feeling of soreness in the windpipe internally, in the situation of the wound.

Sir Charles Bell began his lecture by remarking, that as it was early in the season, few of the gentlemen had probably advanced so far as to be familiar with the larynx by demonstration, and the older pupils would not be unwilling to hear a short recapitulation of the anatomy. He should therefore give a description of the larynx. This he did, first taking it as a piece of mechanism, consisting of cartilages and muscles, and then he dwelt upon the sensibilities with which it is endowed. It was, he said, a surprising circumstance, that this sensibility, which was a guard upon the passage to the lungs, and without which we would not have a moment's security to life, should become, from the circumstances to which he was about to allude, a cause of death: for if foreign matter

lodge about the glottis, though it be quite too small to interrupt the passage, yet will it produce spasmodic stricture. If the morsel be interrupted in the pharynx, the glottis is spasmodically shut; if the surfaces hereabouts be inflamed, the very air itself becomes a source of irritation and spasm; and if ulceration should take place, or coagulable lymph be thrown out, it will cause death, more by exciting the spasm of these muscles than by producing actual obstruction. He then drew a contrast between the condition of the parts as we examine them in the dead body, and the actual circumstances in which we may have to operate. It would seem, he said, strange that he should recommend the exercise of the imagination in an art like surgery; and yet some of the most dangerous precepts are to be found in books, because the authors have not set forth the actual circumstances, the scene in which the surgeon has to act, and the condition of the patient who has to suffer. At present he had no occasion to describe to his hearers, the actual circumstances, or to excite their sympathies: they had seen this old man, after long suffering, sitting up in bed, incapable of utterance, looking round for aid, gasping for breath, and his hands abroad; his face and neck flushed, and his eyes sparkling. "You have witnessed," continued the lecturer, "the condition in which you have to operate in these cases. So far from being able to lay the patient down, or stretch out his neck, you have seen how the shoulders, sternum, and clavicle were raised, the head drawn down, and the cartilages of the larynx squeezed together by their muscles. But most of all, it is necessary that you reflect upon the condition of venous turgescence, and, indeed, of arterial action too, which characterises the parts. I am reminded of this by a circumstance which you see stated in the case: the skin was pinched up and cut across, and this was immediately followed by streams of arterial blood from both sides of the wound. If I had cut upon the thyroid gland, you would have been able to tell me whence this blood came; but these arteries did not belong to the branches of the third, fourth or fifth degree of minuteness—they are not known in your anatomy—they are merely cutaneous vessels; and yet you saw that they both required the ligature. This should teach you to be very observant of the circumstances in which you operate: and you would do well to remember that the veins bleed with unexpected profusion, in consequence of the difficulty of the return of blood into the chest during this condition of obstructed breathing.

There cannot be a greater proof of the suffering and anxiety of a patient with impeded respiration, than the readiness with which he submits to the operation; since it is one which must appear to him of the most desperate nature, and which he has heard of only as the certain means of death. Again: you have seen what has always appeared to me a remarkable phenomenon; no sooner is the breathing made free by your operation than the patient falls asleep. This man, although half a dozen candles were close to his face, and we were, with bloody hands, still actively engaged in providing for his

safety, fell sound asleep. Can there be a better proof of his long continued struggle than this? Can there be a better instance of the value of our profession?

Sir C. Bell then made a distinction of the cases for which this operation requires to be performed.

In the present instance, where there is no accident, or drawing of a foreign body into the windpipe, we have to ascertain where the disease is seated; and you may have perceived how my excellent colleague was desirous, by percussion of the thorax, to find whether the lungs were affected, or were in any measure the cause of the patient's very obvious distress. It has occurred that the operation has been performed when the impediment to breathing was below the part operated on; and the suffering has thus only been aggravated. The disease in the tube may be venereal ulcer, or scrofulous ulcer and abscess about the cartilages of the larynx; or *cynanche laryngea*, or *cynanche trachealis*. The inflammation may have subsided, leaving an *œdema* of the membrane of the larynx, which is in danger of choking the passage: and all these circumstances are important, since the success of the operation will depend on the temporary nature of the obstruction.

Perhaps the most important question that you can entertain, regards the time when the operation is to be performed. I have known it repeatedly happen that the medical consultants have delayed the operation, in the expectation of the circumstances of the case more distinctly vindicating the propriety of their decision. Observe, then, how a disease which is local at first, extends its influence to the lungs themselves. The spasm in the larynx, and the laborious respiration, are, at last, attended with effusion into the lungs. Either the mucous secretion in the bronchi is increased, so as to impede the entrance of the air, or the effusion into the cellular texture of the lungs compresses the bronchial cells: however this may be, the effect is but too obvious; we see it in the common inflammatory croup, that the child, which is at first struggling with an obvious difficulty of breathing, and with the face flushed, lies, after a certain time, more composed, with less frequent cough, and with cheeks pale and cold. If in this condition, the larynx or windpipe could be relieved, it would avail nothing; the child would not recover; and so I have known the operation delayed in an adult who had *cynanche laryngea*, until coldness and indifference characterised the condition of the patient; and when the operation of laryngotomy was performed, there was not even a temporary amelioration produced.

On the 17th the subject was renewed, on coming down from the visit to the patient.

You have again seen this man, reduced somewhat and pale, and his voice more raucous than natural, but otherwise perfectly well, and only desirous for more food. The opening is closed; in short, he presents such a contrast to his former condition of agitation and suffering, as must interest you in the practical question. It now

appears to have been a case of inflammation of the larynx ; and it is possible that much of the difficulty of breathing may have proceeded from œdematous swelling of the membrane. The case naturally recalls to my recollection some other occurrences. Some time ago a man lay in Hertford ward with a disease in the head of his tibia. There was reason to believe that his pains were syphilitic ; and you are aware that when this disease has thoroughly affected the bones, mercurial action should be slowly raised, and long continued. He was attacked with mercurial erythema ; and, as frequently happens, a blush in the pharynx showed the sympathy of that surface with the general condition of the skin. As soon as this was observed, the treatment was immediately changed ; but a night or two after, he was seized with suffocation, and the house surgeon being raised from bed, thought to relieve him by bleeding. The patient died before the morning. Now, although such treatment might account for his death in the lowness and faintness that accompanies the mercurial action upon the system, yet it appeared from the condition of the membrane of the glottis, as disclosed upon dissection, that we might ascribe his death, with more probability, to the serous effusion and gorging of the membrane of the rima glottidis.

There is another subject which it is my duty particularly to press upon your attention. Many of you must recollect the young woman who lay opposite the door in Northumberland ward ; she was subject to disease apparently of the kidney and bladder, but may have struck you more, perhaps, as being a remarkable example of aphonia. She could not produce the slightest tremor in speaking ; her whisper was so low that it required the nurse to put her ear close to her lips ; and what gave unusual interest to her case was, that she had had the operation of laryngotomy twice performed on her. She must have been attended by a ready-handed surgeon ; for besides this, she had suffered extirpation of both amygdalæ. Now, this girl one night had an attack of difficulty of respiration, amounting almost to suffocation ; but this was removed by giving her ether and opium. She had, besides, other symptoms strongly characteristic of hysteria ; and I confess to you that my conception altogether of this case was, that the operations had been performed without necessity. I remember to have been sent for to perform the operation of laryngotomy in a woman, whom I found struggling in an hysterical paroxysm. The next morning she breathed and spoke perfectly well, but could not pass a drop of urine. Now, these are circumstances occurring under your own eye, which I have no doubt will persuade you that discretion and the power of discriminating, are above every thing necessary in the practice of your profession. And here let me point out to you a paper in the last volume of the *Medico-Chirurgical Transactions*, by Mr. Wood, as conveying a great deal of information upon this subject, and as an example to you. He had been well educated in anatomy and pathology ; but not satisfied with that, as has been too much the usage here, he

has had recourse to books, and has furnished us with a paper well supported by authorities and sound argument. This is becoming in young men when they write on practical subjects: and nothing can be more ridiculous than the contrary mode of proceeding—when you find men, in the first years of their practice, dictating to the whole profession. You will hear with regret, that this young author, who promised so well, has very lately died of cholera.

Let me now say a few words upon the operation. The perforation of the tube in this case was made in the membranous space between the thyroid and cricoid cartilages; but I must acknowledge, that when there is disease in the larynx, it would be well if the operation could be performed lower down. Let us not, however, conceal from ourselves the difficulty of doing this. If you cut upon the fore part of the trachea, you have a deluge of blood from the thyroid gland or guttural veins; and you must suspend the operation or use the actual cautery; and unless this precaution be taken, that may happen in your hands, which has happened again and again, that the patient has been suffocated—drowned, I may say—in his own blood. After reading the case, I need not point out to you how much the sternum is elevated, and the larynx drawn down—how the trachea is sunk, or drawn backwards—how deep and confined the whole space is; and it is these considerations which suggest to me a slight change on the mode of operating. If you see reason for operating lower than the part perforated in the present instance, instead of cutting with the knife carried longitudinally on the face of the trachea, where blood flows at every touch, clear the convexity of the cricoid cartilage, and keeping close to its surface, the firm cartilage being your guide, separate the soft parts, pushing them downwards off the front of the tube. Having done this, perforate, with the knife transverse, between the cricoid cartilage and first ring of the trachea. If blood should be in the wound at this time, it will not be drawn into the windpipe, because the slit which you have made in the tube is not open. Through that slit I would have you introduce the canula; but to do this the canula must be prepared. To have a sharp stilette in it is not without danger; for you must recollect that it is on record, that, in attempting to perforate with the trocar and stilette, the trachea has been transfixed. This is a thing not easily comprehended whilst you study these parts in the dead body, but witnessing the difficulty of doing the operation in the living body, you may conceive it possible. The canula must have within it either a conical piece of wood, or a bougie, which shall pass easily into the slit, and convey in the silver tube; or the tube itself must be cut obliquely at the further end, so as to slip into the perforation; which latter mode is much to be preferred, because the instant it is introduced there will be relief; whereas by using the trocar with the stilette, there is a temporary obstruction of the windpipe. When a tube is introduced into the trachea further down than this, and retained there for some time, the ring above the perforation is pressed inwards, and made

convex toward the calibre of the tube, so that there is a permanent straitening of the windpipe at that part; and this, I conceive, will make it difficult, in the event of present success, to withdraw the tube and restore the natural respiration. In the manner of operating which I have suggested, the greater firmness of the cricoid cartilage will prevent this indenting of the upper edge of the perforation. I always hesitate to recommend what I have not actually done, for unexpected circumstances present themselves. I return, therefore, to the consideration of the operation as you have seen it performed. When the membranous space between the thyroid and cricoid cartilages is opened by a crucial incision, upon holding aside the integuments, the patient at once breathes freely. This is of the utmost consequence; it immediately gives him composure; he recovers from the deep struggle which has perhaps too long continued; and the relief is so perfect that he falls asleep. Now this is so essential a benefit, that we must not resign it without very deep consideration. If, for example, on perforating lower down, the inner membrane should exhibit a degree of irritability at all equal to what you saw in the present instance, you would not be able to give the patient relief—certainly not that immediate relief which is required, and only by cutting out a portion of the cartilage. With regard to the effect of this removal of a portion of the cartilage I speak with some hesitation; but it has occurred in this hospital, when the windpipe has been cut by the suicide, that the cartilages have retracted. An unfortunate girl, determined on destroying herself, put a penknife into the centre of her throat and cut downwards, dividing the rings of the trachea; she lived several weeks, and on her death the trachea was found very much diminished in its calibre, by the curling in of the cartilages. If we make the incision longitudinally, without taking away a portion of the cartilage, we cannot expect that the patient can have that relief which we have seen given in the present instance, unless we introduce a tube. Holding up the chin and stretching the neck would not tend to open the slit which you have made in the windpipe, but the contrary; whereas you have seen that in perforating above the cricoid cartilage, by holding apart the integuments and stretching the neck, the patient was remarkably relieved. The snipping away of the angles left by the crucial incision in the membrane, is not so likely to be permanently injurious as taking away a portion of the cartilage, which is essential to the mechanism of the tube, and for preserving the freedom of the passage. The same observation does not apply to the cutting of the cricoid cartilage; but you will remember that it was not my intention to cut through that cartilage; for as it is a continuous ring, and firm at the back part, it would not have opened out: my object was to notch it, and to enlarge the membranous space. It is, perhaps, just as well that the ossification of the cartilage, and the irritability of the membrane within, prevented my accomplishing this, since the recovery has, in all probability, been the more rapid.

Case of Enlarged Tonsils in a Child—Laryngotomy—Excision of Tonsils.

Wm. Flannagan, aged three years and a half, was admitted, Dec. 6th, for enlarged tonsils, causing occasional paroxysms of difficult breathing. Owing to the child's crying and resisting examination, it was not easy to see into the back of the throat, but it was ascertained that the tonsils were large, and lodged deep in the fauces, and that they presented a considerable swelling on each side of the neck. The breathing was thick, the child keeping his mouth open. It is reported that it is during the night that the attacks of difficult breathing principally come on. His health does not appear to have suffered much.

He was treated for some time with iodine taken internally, and blisters applied to the neck. During this course he was always found playing about the ward, as if he suffered no inconvenience from his complaint. But it was more than once reported by the nurse, that he had been seized during the night with some fits of difficult breathing that alarmed her, and made her fear that he would be suffocated.

9th January.—In Mr. Tuson's absence, the patient came under the care of Mr. Shaw. Finding that he had passed a worse night than usual, it was resolved to attempt to remove one of the tonsils. But in proceeding to do this, it was found impossible to get a clear view of either of them. This was partly owing to the tonsils being situated low and concealed by the tongue, but also to the quantity of mucus that filled the back of the throat, and which could not be expelled by the efforts of the child. Besides, from being obliged to force the jaws open, the child cried; and he was then seized with fits of coughing which added continually to the mucus in the throat. Nothing was therefore done; but he was ordered to have successive emetics, with the view of clearing the fauces, in order that the attempt at excision might be renewed on the following day.

10th January.—Mr. Shaw succeeded, without much difficulty, in removing a portion of the right tonsil, about the size of the last joint of the forefinger. This was accomplished by seizing the tonsil, near its base, with the tenaculum, drawing the enlarged body forwards, and cutting out the tenaculum with the part it embraced, by means of the probe-pointed curved seissors. It may be noticed, that the vomiting by the emetics had had the effect of clearing away the accumulated mucus. In fixing the tongue, and holding it forwards and downwards at the same time, the scoop from the lithotomy case was found very useful.

13th January.—The child appeared to have suffered no ill effects, but, on the contrary, to have derived benefit from the operation. He had no recurrence of the attacks of difficult breathing at night; and he was seen to-day, at the usual visit, looking better than at any previous time. But a little after lecture (at half-past three

o'clock), Mr. Shaw was summoned to come with all haste to the hospital, as it was reported that the child was being suffocated.

He was found in the arms of the nurse, breathing with great difficulty, his face pallid, wax-like, and dark about the lips and eyes. When Mr. Shaw arrived, it was thought that he had rallied a little, owing to the house-apothecary having induced some vomiting by a feather in the throat. A warm bath was speedily procured, and further efforts were made to get him to cough up the mucus, but this was attended with little success. He was watched for nearly an hour, when it was obvious that torpor and coma were increasing to a dangerous degree, while his breathing did not decidedly improve.

Mr. Shaw therefore proceeded, with the assistance of Mr. Arnott, to make an opening in the larynx, by cutting through the crico-thyroid membrane and removing a portion of the cricoid cartilage. The incision was a little more than an inch in length. Considerable venous hemorrhage continued to take place while cutting down upon the membrane; and this necessarily obscured the bottom of the wound. In consequence of the difficult breathing, the chest was elevated and the neck shortened, which caused the larynx to be not only drawn close to the sternum, but situated much deeper than natural. Again, in consequence of the larynx constantly changing its place, being sometimes drawn powerfully upwards and then immediately depressed to the same extent, it was necessary, in laying bare the membrane, before perforating it, to follow its motions with the finger, and to cut with the point of the knife, guided by the finger. The situation of the membrane was recognised by feeling for the notch in the upper border of the thyroid cartilage, and making allowance for the narrow interval, in the larynx of the child, occupied by cartilage, between the notch and the membrane; and then, by feeling the prominent ring composing the fore part of the cricoid cartilage below. (The operator, it may be remarked, would be foiled if he expected to find a prominence in the thyroid cartilage at this age, answering to that of the *pomum Adami* in the adult.) It was observed, in clearing the surface of the membrane, that occasionally a portion of the thyroid gland started into the lower part of the wound, so as even to obscure the membrane; and this was apparently produced by the gland being squeezed into the space by the violent action of the muscles embracing it on both sides, and which pressed its lower part against the remains of the thymus gland and the fascia, occupying the superior opening of the thorax. After the crico-thyroid membrane had been sufficiently exposed, a little time was allowed for the hemorrhage to subside, before inserting the point of the bistoury into it. A longitudinal incision was made, extending through the membrane and the centre of the cricoid cartilage. A slight cut was then made transversely along the lower border of the cricoid cartilage on each side, so as to liberate it somewhat before snipping off portions, both of it and the membrane, with the scissors. Considerable difficulty was experienced in removing these portions owing to the

remarkable sensibility of the mucous surface of this part of the larynx ; for, before using the scissors, it was necessary, of course, to raise the angle which had to be cut off, and this could only be done by transfixing it with the hook from within ; but so great was the sensibility of the membrane, that whenever it was pierced, a fit of coughing, attended with a gasping and struggling, as well as a rapid motion of the larynx, was the result. When, however, after some ineffectual attempts, the portions intended to be cut away were removed, the orifice was of a size sufficient to admit a tube as large as a writing quill ; the child breathed through the orifice with ease ; but on an elastic tube being inserted into the wound, it brought on such paroxysms of suffocation that it had to be withdrawn. Retractors, made by doubling a catheter wire, and then forming a hook at the part where it was bent, were now applied to the two lips of the wound, and fixed behind the neck, so as to hold the wound open : but the child would not allow these to remain. Adhesive straps were accordingly substituted, the ends of which were placed close to the edges of the wound, and after having got a hold they were drawn backwards upon the neck, so as to keep the lips apart. These answered very well, and the child breathed softly and easily. A nurse was ordered to sit beside and watch him.

14th January.—A remarkable improvement is visible in this child ; he breathes tranquilly through the wound : his countenance has a clearness and freshness that indicate the relief he has obtained. (It is no small mark of his amendment, that in one hand he holds a goodly slice of bread and butter, while in the other he has a boiled potato.) He is occasionally troubled with a slight cough.

16th.—There was some alarm last night, from his being threatened with a recurrence of his difficult breathing. This appears to be brought on by his drooping his head when sleeping, and thus closing the orifice of the wound. From watching his breathing, it is supposed that he breathes both through the wound and the natural passages ; but he begins to cry whenever the wound is closed for the purpose of ascertaining this, and his crying brings on a fit of difficult breathing. Mucus is still expelled from the wound. There is a constant hacking cough, apparently induced by the mucus collected at the upper part of the larynx irritating the glottis, or perhaps kept up by the remaining enlarged tonsil being in contact with that part. The house-surgeon is instructed to introduce a tube into the trachea through the wound, if the symptoms be again urgent.

For the two following days the reports were favourable. The nurse stated, that when she filled up the wound, while clearing it of mucus, the child sometimes uttered a word or two.

19th.—His breathing is undisturbed ; but he looks ill, and is peevish. He has had purging, which has been checked, by administering hydrarg. c. creta, with soda and aromatic confection.

During the following ten days, the child varied in his condition : sometimes he caused alarm by his laborious breathing and appear-

ance of exhaustion ; and at other times he was considerably better. From his feverishness, and having a running at the nose and cough, it was concluded that he had influenza superadded to his original illness. He derived benefit from the saline mixture, prepared with an excess of acid.

30th.—The wound, after narrowing daily, is closed, and covered with a moist crust.

Feb. 7th.—There is now a gratifying change. The cough is almost gone. The countenance exhibits an appearance of health. He plays with the other children in the ward. The swelling caused by the enlarged tonsil on the left side is scarcely discernible. The wound is nearly cicatrised.

Feb. 21st.—He was dismissed.

March 14th.—The mother brought her child again to the hospital, requesting to have another operation performed, as every night, when he fell asleep, fits of suffocation came on that kept her in continual alarm. Notwithstanding this account, he is in better health than when he left the hospital. On examining the left tonsil, it was seen to present a little above the tongue, and it was shifted somewhat towards the right side.

20th.—Hitherto nothing has been done, as there have been some reasons for supposing the attacks of spasmodic breathing to be owing to hooping-cough. He has been taking rhubarb and soda, with a grain of extract of hyoscyamus, twice a day. He has always been found running about the wards during the day ; but for several nights he has disturbed the patients by the noise he makes in breathing, and by his fits of coughing.

21st.—To-day, Mr. Shaw removed, with the tenaculum and scissors, the greater part of the remaining enlarged tonsil.

April 1st.—No unfavourable consequences resulted from the operation. The breathing is no longer accompanied with noise or spasms, as before ; and he sleeps soundly.

He was dismissed to-day, cured.

Lecture on Esophagotomy.

GENTLEMEN,—Coming from the operation that has just been performed, you are naturally anxious to understand the necessity for it, and you are entitled to know what is passing in the surgeon's mind.

Here is a practical question, and you must approach it by bringing to your recollection the structure and function of the parts ; for believe me that there is no studying even that which you may call a practical subject, without laying a foundation in the knowledge of the proper functions of the organs concerned.

When speaking of laryngotomy in a former lecture, I alluded to a point to which I must now recur. There are certain sensibilities situated in different parts of the body, unlike the common sensibility of the surface, and unlike the sensibility of the different organs of

sense: these are given for the purpose of drawing into combination or sympathy a variety of muscles, some of which may, perhaps, be placed in distant parts of the body, but the combination of which is necessary to the performance of a certain act. The act of swallowing is one of these; and if there were not a sensibility situated in the pharynx, controlling the respiratory muscles, and bringing on a succession of involuntary actions in the pharynx, œsophagus, and diaphragm, you certainly could not swallow without suffocation. Observe, then, what takes place in the act of deglutition. By an act of volition you move the morsel in the mouth, by volition you thrust it back into the pharynx, and the moment that it passes the arches of the pharynx, the constrictor isthmi faucium and the palatopharyngeus act together, and seize upon the morsel. This, you will observe, is the first act of an involuntary operation: the muscles urge the morsel into the superior constrictor of the pharynx; then, in succession, into the middle and inferior; which places it under the grasp of the tunica vaginalis gnlæ: and even now the morsel cannot descend unless a relaxation takes place in the fibres of the diaphragm, through which the œsophagus passes. The moment that the morsel comes under the action of the constrictors of the palate, it is no longer an act of volition. The beautiful provision here is, that there is a sensibility drawing all these muscles into co-operation, which volition could not do: it is one of the instances in which a sensibility is placed in a part in order that certain muscles may be controlled and act without the interposition of the will.

But there is another curious part of this function, which is the sudden and absolute stopping of all action in the muscles of inspiration. If the breathing went on at this time, of course the morsel would be drawn into the larynx, and suffocation would be the result. The curious thing worthy of admiration as proving design and benevolence is, that while one set of actions is excited by sensibility, another is totally stopped. Then here is the very point for your consideration; you perceive that if the morsel be stopped in its descent, inspiration must be suspended, and suffocation follow, as certainly as if the morsel plugged up the opening of the glottis.

Now taking this as the principle upon which we are to examine the facts before us, give me your attention to the following circumstance. In passing the waiting-room some time ago, I heard a great noise, a very voluble tongue, an Irishwoman scolding; not drunk, but worse than drunk; in that state of violence, almost madness, which long continued indulgence in tippling produces. This woman had a piece of meat sticking in her throat, and my observation was a natural one, that she could not be very ill if she could speak so loud and long, but that it was right to take her into the hospital, and not to lose sight of her until she was relieved. She would not remain in the house. She went out, but was brought in again in the evening much worse, and she died in the middle of the night. Upon examining the body, a large piece of meat was found, not in

the pharynx, but thrust out of the pharynx, and lodged betwixt it and the spine.

[The case was here read. It appeared that this woman was nearly choked whilst sitting at dinner; that to relieve herself, she pushed the handle of her knife down her throat with great violence, and that the knife was wrested from her by force. After this she got the assistance of a surgeon, who passed a probang into her throat; and then, not feeling relief, she came to the hospital. The probang, with the sponge, was passed repeatedly, with great ease, into her stomach. When brought a second time into the hospital, she had difficulty of breathing, which she had not at first. This oppression and difficulty of her breathing increased during the night, attended with emphysema of the neck, and towards morning she died. On dissection, a rent was found in the pharynx at its lowest part, and a tough piece of meat was lodged out of the pharynx, and anterior to the spine. Effusion extended down the tract of cellular membrane, along the œsophagus into the chest, and both cavities of the chest contained a large quantity of serum.]

The first observation that I will make to you, gentlemen, is to think of what you ought to do on common occurrences, and not always to contemplate such horrible consequences as you have seen to-day, or as you have heard narrated in this case. When a person has a piece of gristle or beef sticking in the pharynx, and choking him, you know that it is situated high in the pharynx, because it does not choke the person, unless it be nearly in contact with the glottis, or epiglottis. Now observe the consequence of this, that when a person is actually choking from a piece of meat in the pharynx, you can reach it with the finger. You can with the point of the finger, which is the best probang, unfix it, and then the natural action of the parts brings it all up. That is a common occurrence, and it is best to avoid instruments; and let me here remind those gentlemen who are leaving town, that they should not incur much expense in surgical instruments, except in the department of forceps. Pick up what curious instruments of this kind you can, and carry them into the country; you will always find a use for them. I mean such forceps as are applicable to the natural passages.

Here is a case which strikingly illustrates the propriety of the rule to endeavour first to bring the body up that is impacted in the œsophagus. There is a danger in thrusting the body downwards, because you may fix it so firmly that it cannot be got out. In this case it does really appear that there was a degree of violence done which no surgeon could be capable of; and accordingly the narrative states that the friends by force took the knife out of the hands of the woman, with which she was thrusting the morsel down her own throat. I told you that she was crazy with drink. The morsel then was thrust through the loose fibres of the pharynx, out of the funnel-like part, and through the fleshy columns, and it was lodged in the cellular membrane, between the pharynx and the spine. It appears that a passage was made nearly as far as to the

subclavian ; but it does not follow that this was by the introduction of the probang ; the probang passed down freely—there is no proof that it was forced at all ; on the contrary, that which produced the obstruction was out of the gullet, and the instrument passed freely down. What, then, was the cause of death ? That is an important question.

When once you make a breach upon the pharynx or the œsophagus, every time that the patient attempts to swallow, a portion of food or fluid gets into the opening and breaks its way into the cellular membrane. You remember perfectly well that there is a loose texture of cellular membrane extending all the way by the side of the œsophagus into the mediastinum, so that, without presuming any error on the part of the medical attendants, the fluid which the patient drank might escape from the rent in the pharynx, and so work its way down the cellular membrane, even to the loose texture of the mediastinum, and within the chest itself. I am not speculating ; I have known such a circumstance happen ; I have found fluid that was swallowed in the cellular membrane of the mediastinum. I fancy then that this is the key to the whole case ; that it was not the obstruction in the œsophagus that directly caused suffocation, because the portion seemed to have been removed from the neighbourhood of the windpipe ; but on dissection it appeared that there was inflammation enough of the neck, thorax, and lungs, to account for the effusion into the cavity of the thorax ; and from these secondary effects she must have died. The emphysema in the neck confirms this, for the air did not come from the lungs ; it must have been propelled from the pharynx into the loose cellular membrane during the act of swallowing.

The next circumstance in the history of the occurrences of this hospital, and it may be in the recollection of some of you, is that a man was brought in with a bone sticking in his œsophagus. In the last case it was a piece of gristle, or a piece of beef ; in this it was a bone of a sheep's tail. Observe the effect : the bone stuck in the œsophagus, and at last ulcerated into the trachea. Now you will see what was passing in our minds with regard to the child that has just been operated upon—that there is danger of a piece of bone, which has become fixed in the gullet, ulcerating into the air-tube. The patient to whom I have just alluded died in consequence of the bone having stuck in the œsophagus, and then made a hole by ulceration in the trachea.

The next instance on record (all these cases occurred within a short period) is that of a man who was brought in with a piece of meat sticking in the pharynx, and causing suffocation. In this case the house-surgeon performed laryngotomy ; but it was too late—the man did not recover. When I inquired why efforts had not been made to extract the body through the mouth, I learned that the teeth were firmly clenched during the short interval that the patient lived.

Now these are circumstances that bring us to reflect on the condition of this child. In the present case, which has no doubt interested you in the highest degree, you find that the patient is only two years and three months old. The mother brings the child; she is in great alarm, but the child not apparently suffering much. The mother says that she has been accustomed to give her child a bone to pick. "I gave him," she says, holding up her hands above her head with the utmost agony, "a mutton bone with some meat upon it, expecting him to pick it, and he swallowed the whole, since which time he has not been able to swallow any thing solid, only a little liquid." The child breathes freely; he can swallow soup or milk, but he cannot swallow any thing solid. Attempts have been made to extract this body, first by the house-surgeon, and in succession by the surgeons of the hospital. The body can be touched by the point of the finger; it appears to be lodged to the right of the glottis, and fixed in the membrane of the œsophagus. We can just touch a sharp point with the finger, and on any attempt being made to catch it, it escapes and descends lower. A variety of instruments have been tried—the hook of the probang, the crane-bill forceps, and twisted wire made into a hook; and instruments of various construction have been forged for the purpose of unfixing and hooking this piece of bone, but all without effect. Four weeks have elapsed since this unfortunate accident, and a consultation was with much propriety held upon it. The result of this consultation was, that the child could not be permitted to remain in this hazardous state, that he might in an instant be suffocated, and we should have to blame ourselves, not certainly for indifference, but for inactivity.

It appeared that this sharp, ragged, abrupt piece of bone, could be felt; and it further appeared, that, if it were permitted to remain, ulceration would take place. Now ulceration, I repeat, into the pharynx would have produced this effect—that whenever the child was fed, a portion of whatever it swallowed would be received into the ulcerated hole, and, gradually, a bag would have been formed there. This would be the effect of the ulceration of the pharynx merely; but what would be the result of ulceration into the trachea or larynx?—suffocation; for when ulceration takes place in the larynx, there is such a degree of irritation produced that the person is suffocated. For example, when there is an abscess outside of the larynx, and the abscess works its way by ulceration into the larynx, the person is suffocated; not by the quantity of matter thrown into the windpipe—no, that is not the cause; but by the inflammation attending the ulceration, and the consequent irritation increasing till spasm of the glottis produces suffocation. I trust then, that nothing more need be said to carry you with us in determining upon the propriety of this operation.

You have seen the nature of the operation, and it must have impressed the conviction on your minds that it is one not to be

lightly undertaken. You have seen the parts in which the incision is made, and the depth to which it must be carried, and you are aware of the hazard of the operation, unless there be a very intelligent and active surgeon, and that surgeon well seconded. With regard to the operation itself, what I suggested was, to make an incision upon the margin of the sterno-cleido-mastoid muscle, then to pass the director under the platysma myoides, and slit it up; next, with the handle of the knife, to dissect between the larynx and under the sterno-cleido-mastoidens, and to cut very little there with the edge of the knife. When the margin of the sterno-cleido-mastoidens was turned aside, I recommended that Weiss's forceps for the urethra should be passed from the mouth into the pharynx, and that it should be brought round so as to push out the pharynx at the incision; which I had done formerly myself with great ease, owing to the yielding nature of the pharynx. By cutting deep without this direction you run a great hazard; while, by passing the instrument into the mouth, you can bring the part quite up above the margin of the wound. You will observe the advantage of using this kind of forceps; for when the surgeon has cut upon the end of it, and brought it out at the wound, he has only to open the forceps, when the wound of the pharynx dilates easily; and then, putting the finger betwixt the blades, it can easily be carried into the pharynx.

Though one cannot but feel a good deal during the delay of an operation, when it is over I reflect upon it as an advantage to you; for there is nothing of which I am more afraid than that you should consider such operations as slight matters, and easily performed. When you see an operation done speedily, and without hesitation or seeming difficulty, you are betrayed into the belief that it is easily done, and perhaps the difficulty occurs only in your own practice. You have seen the operation performed with every proper precaution: you have seen the necessity of taking up arteries, branches of the superior thyroid (you are anterior to the sheath of the carotid, and above the bend of the inferior thyroid;) you have seen the operation, in short, performed in a manner that you may safely imitate. You must have noticed that the incision must go very deep, unless you use the precaution of introducing an instrument that may serve as a directory from within. A catheter was used for this purpose, and you observed the manner in which the operator proceeded. When the point of it was cut upon and brought out, he took hold of the end with the blades of the forceps, and then drawing the point of the catheter back into the pharynx, the forceps were carried along with it. By expanding the blades of the forceps, he made room for the passage of his finger, and in this way, as you might have observed, there was no occasion for much cutting of the pharynx. The opening was made just at the termination of the pharynx and the beginning of the œsophagus. On introducing the finger here he felt the bone sticking firmly; and using the polypus

forceps, he grasped it, and brought it out—a sharp, quadrangular portion of bone, the spinous process of a vertebra.¹

Now I trust that the child will do well, and that it will show us all the happy results of good surgery; but do let me impress this upon you, that the operation has not been done without great anxiety on the part of the surgeon, and an absolute conviction of its necessity.

There is one other point, connected with this operation on the pharynx—the formation of a bag. You must reflect upon this. There are two ways in which the cul de sac, or bag in the pharynx is formed. One is, when a little ulceration takes place in the pharynx, and a portion of each morsel that is swallowed is urged into it. In the course of time, from these minute deposits, the ulcerated spot becomes a bag—a bag which makes its way behind the fleshy columns of the constrictor pharyngis; and unfortunately it happens, that from the portions of food being deposited there in succession, a little and a little at a time, the bag at last acquires such a volume as to compress the œsophagus, and to prevent deglutition. This is one of the most difficult cases to treat, if it ever has been well treated. But there is another way in which a bag may form. The pharynx and the œsophagus are subject to extraordinary attacks of spasm, and in hysterical women especially. You will have the voluntary act of deglutition opposed to the involuntary act; that is to say, the person will attempt to swallow, but the involuntary act will not follow the attempt, and consequently the pharynx becomes enormously distended, the morsel not being sent down. Dilatation of the pharynx is in this way frequently made, and a portion of the inner membrane is at last thrust between the columns of the surrounding muscles, precisely as it takes place in the urinary bladder; for when there is a sac in the urinary bladder, it is produced by the violent action of the bladder itself, thrusting the mucous membrane through the fibres of the detrusor urinæ, until a sac is formed. So it happens that a bag is formed of the inner membrane of the pharynx, which is thus thrust between the columns of the constrictor pharyngis: and then the unfortunate result takes place which I have described; portions of the food are deposited there, and more and more gradually accumulates, until at last there is a bag crossing between the spine and œsophagus, and the person, if not relieved, dies of inanition. Relief in these cases is very difficult to be obtained; because, if you attempt to introduce an instrument, it is, just as the food, more apt to pass into the sac than into the œsophagus. We would say, do not let the person eat any more by a voluntary act, but be fed by a tube, so that the sac may not be filled; but the difficulty of passing a tube through the right passage, and so as to avoid the false one, is so great, that if the patient continue to swallow liquids, it is still deposited in the sac,

¹ See Mr. Arnott's paper in the Trans. Med. Chir. Society.

and there necessarily follows great ulceration, great mischief, and death attended with protracted suffering.

Now I touch upon this, gentlemen, because I wish you to observe what is the effect of any breach upon the surface of the pharynx, and why I am always unwilling to perform any operation upon the pharynx or œsophagus, either within or without. Of course, in the present case, attention will be paid that the food is not permitted to lodge in the wound.

Aneurism of the Aorta mistaken for Dysphagia.

"Robert Linan, 43 years of age, came here on Tuesday the 9th of December. He had not been able to swallow even a drop of liquid since the preceding Friday; he is a little, spare, sallow man; he speaks in a whisper, that conveys the idea of disease in the larynx. In May last he was admitted into the physicians' ward; and he had difficulty of breathing, cough, and some hoarseness; he got considerably better at the end of three months; he had never spit blood. In the beginning of October he first felt difficulty of swallowing, and came here for relief. Two blisters were applied to the throat, and these almost immediately relieved the dysphagia.

"He has returned again. He lost the power of swallowing on Monday; the difficulty continued with little abatement till Thursday. He appears to have taken almond emulsion, and vinum ipecacuanhæ, with some relief; but he always found it necessary to take a little fluid after every solid mouthful, to get it to pass an obstruction just below the cricoid cartilage. On Friday he had eaten his dinner as well as usual, but at supper he found that he could not swallow even a cup of chocolate. Suffering no pain further than that of thirst, he allowed it to go on till Monday night, in the hope of its getting well of itself, and followed his usual avocations. At eight o'clock that night he came to the hospital, and had half a dozen leeches put on his neck. On Tuesday the œsophagus was examined with the soft wax bougie, but the instrument did not pass; and it was observed on withdrawal to be flattened on one side. He now attempted to swallow a little milk and water: it seemed for a little to be swallowed, but it brought on a fit of coughing; and after a little, a sort of eructation brought it all up again. He was sent into the ward. On inquiry, it was found to have been the belief that his disease was ulceration of the larynx, and spasm of the lower part of the pharynx. A solution of nitrate of silver, eight grains to the ounce, was applied with the sponge of the probang. After this he attempted to swallow some warm milk and water; it remained for a minute in the œsophagus, but soon brought on a fit of coughing, and then it was brought up by eructations as before. The pulse was getting weak for want of sustenance, and an injection of a pint of strong beef-tea was administered, after which he felt greatly refreshed. He had a liniment of

camphorated oil and tinct. opii rubbed on the sides of his throat. He was furnished with some beef-tea, and Reid's injecting apparatus, to use in the night, as he was obliged to go home to attend on a helpless wife, who could not undress herself without his assistance. He returned in the morning very faint. He was now seen by the surgeon, who attempted to introduce an elastic catheter, No. 4 or 5, and after a little hesitation at the termination of the pharynx, it passed freely down its whole length. The precaution of passing the instrument through paper, and holding a lighted candle to it, was taken, lest by any chance it should have passed into the larynx. A mouthful of milk was now squirted through the tube. It went down, but there was evidently resistance; and on removing the lips the milk returned spouting from the catheter; this was again repeated with the same results. The catheter was withdrawn, and he attempted to swallow, but in a minute or two the coughing and eructation came on as before, and what he had seemed to swallow returned. He was so weak that the fatigue of the operation made him faint. He was now put into the warm bath to relieve the thirst, which he said was such as almost to madden him at the sight of liquid. After the bath he was more comfortable than he had been since the attack began, and fell asleep. The linimentum hydrargyri was rubbed into his neck; and he had some mucilage and tinct. opii, of which he was occasionally to sip a little, and to let it lie in the pharynx as long as possible. During the day he was nourished with frequent injections of beef-tea and mutton-broth. In the afternoon the bath was repeated, and attempts made with a small catheter similar to those described in the morning. The catheter was again passed by the house-surgeon, but with no advantage; it did not pass the stricture, which appeared to be in the commencement of the œsophagus. As he sat at the fire he brought up what appeared to be a piece of meat.

"11th.—This is the sixth day since a drop of liquid has been swallowed; he does not complain of hunger, but of intolerable thirst. He says he has experienced great comfort from the mucilage and opium, which was the only thing that did not immediately bring on a fit of coughing and eructation. He has brought up several little pieces of meat, which look like shreds of boiled beef, which he spat up in the night. At half past twelve he met the surgeon at the door of the ward in great joy, having at length succeeded in swallowing some milk. Beef-tea was now given him, which he swallowed with considerable ease.

"*Vespere*.—The nurse has been too kind to him, giving him more than his allowance of broth, which was ample; the pulse is a little excited; his thirst is still great, but he was ordered to take nothing more than a little nutriment, and to have a spoonful of castor oil in warm milk."

COMMENTARY.—I am sure this is a case that must go to your hearts. There can be nothing more touching than to see a man actually starving, and suffering from excessive thirst; exhausted,

misery in his looks, and absolutely fainting from inanition ; and the conviction at once arises in your minds that something must be done immediately. Now I do assure you that I came to the hospital that morning very uncomfortable in my feelings, expecting to find him worse, and that an operation of great danger and difficulty must be done for his life ; for I saw no alternative, although the circumstances were altogether new.

But there is a circumstance of interest—the rejection of a piece of meat like boiled and macerated beef or mutton. When this was ejected he had immediate relief, and expressed his thanks energetically, as if I had been the means of saving him. It seems somewhat strange that he should not have known of this sticking of the food in the throat until it was brought up ; and it is no less remarkable, that the rejection of these portions permitted him to swallow, by relieving the spasm in the pharynx.

The case, then, being represented to me, and having all the appearance of stricture, I said to the man, “Now answer me distinctly this question, when did this extraordinary difficulty come on ?” and he replied, “on a certain day I swallowed perfectly well, and the next day I could not.” That does not look like stricture of the œsophagus ; for when there is real stricture, the person begins his narrative by saying, “O ! I had always a very narrow swallow.” They invariably tell you that they have had a difficulty in swallowing large pieces, and a facility in swallowing liquids. When there is a spasmodic difficulty, it is the very reverse of this : a person can swallow a smooth morsel more easily than a few drops of liquid.

If we possessed eloquence, we should have no occasion for it in the present instance, because the legitimate object and use of eloquence is to prepare the heart for a certain impression ; to remove the prejudices which prevent us seeing clearly or reasoning justly ; and to fit us to understand and fully to appreciate a plain story told by a plain man. But I am quite sure that what you have lately seen in this hospital has opened your understanding, in the first place, to the importance of your profession ; and, more than that, to the severe and anxious duties that you have to perform. It is said that a general arranges his troops, and infuses into them a spirit of conquest ; but deep in his own breast rests the possibility of defeat, and for which he prepares secretly. So ought a surgeon to go forward to his operation with the confidence which knowledge produces ; but in all capital operations he should also revolve, in his own mind, every possible disaster. Now you have seen an operation of great difficulty performed, and you have seen the most disastrous accident taking place during the operation, and you have witnessed, and must, I am sure, fully appreciate, that manly decision and vigour of mind which give calmness and promptness in these circumstances.

The first case I have to mention is one with which you are as

familiar as myself; and I know not what this gentleman whose pen runs so fast, may tell of us, for we have misunderstood the case sadly. The dissection is now before us, and we must acknowledge that we were wrong. "*Il n'est rien de tel que d'être honnête homme,*" say the gentlemen on the other side of the channel; or, according to our homely expression, "honesty is the best policy." I allude to the case which we conceived to be an obstruction of the œsophagus by a piece of meat; and I really think the explanation given by the house-surgeon is better than any thing I have offered—viz. that it was not a piece of meat, but a portion of compressed coagulum from an aneurism, which came up. You will no doubt examine the morbid parts carefully: they are before you. The poor man suddenly died; some blood passed out of his mouth; and upon dissection, his stomach was found full of blood. On further investigation, it was seen that there had been an aneurism of the arch of the aorta; that the aneurism had come in contact with the œsophagus, adhered to, and ulcerated into it; and there is every probability that what was brought up by the act of vomiting was a portion of the white firm coagulum that always forms in aneurism, and prevents the blood for a time from bursting out of the sac.

This being the case, we have some difficulty—and yet not much—in reconciling the symptoms with what you see now before you. For example, you remember I stated that I passed a tube through the part where I conceived the obstruction to be; that I was much surprised, on injecting tepid milk into the tube, to find that it did not pass freely into the stomach; and that when the lips were withdrawn from the tube, the milk came spouting out of the tube again: Now, on dissection, it was found that there was a stricture, but of a spasmodic nature, just behind the larynx—such a stricture, that the point of the finger could not pass; but upon being pressed, the fibres dilated completely: implying that it was not a permanent, but a spasmodic stricture. The tube, it appears, had been passed through this spasmodic stricture opposite the cricoid cartilage; but when the fluid was injected, the aneurism mechanically pressed on the lower part of the œsophagus, and so the fluid distended the space between the mechanical compression below, and the spasmodic stricture above. This explains the filling of the throat, and why, as soon as the syringe was withdrawn, the milk returned by the tube.

You may infer, then, that the observations were not applicable to the circumstances of the case: yet, allow me to say, not altogether remote or foreign. I argued that the piece of meat sticking in the œsophagus had increased the spasm, the spasm occurring where there was no actual disease; and now we find that the aneurismal tumour, pressing on the œsophagus in the posterior mediastinum, was the formidable cause of obstruction, and of the spasmodic difficulty higher in the tube.

Cases of Hernia, illustrative of the principles.

Gentlemen—In the present and the preceding month you have witnessed the operation for hernia performed five times. As the occasion of doing your duty in these cases comes unexpectedly upon you, and especially requires decision, I am very desirous that you should not lose the advantages of these examples, but that, by mature reflection upon them now, you should be prepared, when it becomes your duty, to act with promptitude. It is one benefit of clinical instruction, that, by conversing with you as we pass round the wards, I learn on what to dwell when we are met here. I think I have observed that you mistake very much the importance of tobacco injections. That practice has arisen in a physiological error, and is, I am of opinion, wrong in every view we take of it. The effect desired to be accomplished through it, is to produce debility, with the view of removing “spasm” from the stricture, and to withdraw the intestine by exciting the action of the bowels within. Now, before I proceed to my argument, I must acknowledge that the highest authorities in the profession, both now and heretofore, are in favour of the practice; which will make you weigh my opinions and yield only to conviction. In the first place, there is no such thing as spasm in the neck of a hernial sac. When you perform the operation with the knife, it is not muscle which you cut, and therefore it is not muscle which prevents the reduction of the bowel. As to exciting the action of the intestines within, you must observe that there is just as much danger to be apprehended from this practice as from too great pressure applied from without. If you have attended to the condition of an incarcerated and strangled gut, you will know that there is a portion of the intestinal canal which is in danger from the sharp edge of the stricture pressing upon its reflected angle, and that there are these various causes of failure in hernia.¹—1st, Abdominal inflammation, excited by the writhing and distention of the intestines above the strictured part. 2dly, Mortification of the intestines within the sac. 3dly, Rupture or ulceration of the gut opposite to the line of the stricture. All of these, but particularly the last, are sufficient reasons against augmenting the violent excitement of the bowel within.

Experience convinces me more and more, that the surgeon's practice in hernia must be determined, not by symptoms, but, after having ascertained that the distress of the patient does arise from hernia, by the touch—that is, by feeling the roundness, the fulness and hardness of the tumour, and the narrowness or *pinch* of the neck. You have here the reports of four operations performed in

¹ See a clinical lecture on hernia, by Sir C. Bell, in *Med. Gaz.* vol. iii. page 101.

succession, and all attended with success. Now in each of these it was a small portion of the intestine that was down, and the stricture was, in all the cases, very close; in short, after the surgeon's duty was performed, and the state of the parts ascertained, the opinion was universal, that nothing could have succeeded in reducing the intestines except the edge of the knife. Happily the patients were sent into the hospital early, without violence having been done by the taxis, and there was no delay in performing the operation after they were received. But, unfortunately, it often happens thus: the patient is conveyed to the hospital after a surgeon has done his best out of the house; the house-surgeon makes his attempts, is unsuccessful, and sends for the surgeon of the week; he next examines the tumour, attempts reduction, then orders a large bleeding, the warm-bath, stimulating clysters, and a consultation to be called. Now, with all this, there is too much delay. I hold it to be the duty of the surgeon to make his attempt to reduce the hernia with patience, gentleness, and perseverance: during this time, if he be an intelligent practitioner, and his experience be grounded on the anatomy, he will be better able to determine upon the propriety or the necessity of operating than twenty surgeons standing round the patient's bed, observant merely of the symptoms. And here is the advantage of character in an institution like this—that the patient does not object to the operation, or delay giving his assent, after the opinion of the surgeon has been declared.

To return to the subject of tobacco injections. One advantage I certainly see in that practice: it makes the patient very sick, and low, and cold, and he and his relations acquiesce readily in the surgeon's decision, seeing that there is all the appearance of approaching death. Nor must we omit to observe, that death has, on many occasions, been the consequence of the use of tobacco. The tobacco smoke is exceedingly unmanageable; sometimes producing no effect, but sometimes unexpectedly bringing on lowness of pulse, fainting, cold sweats, sickness, and tossing and anxiety. In regard to the tobacco infusion, you will find that our authorities differ very much as to the quantity that is proper. Sir Astley Cooper has seen one dram, in infusion, prove fatal; while others employ two drams, or even more, in decoction. But my grand objection to the use of tobacco is the procrastination, and the admission that there are any means to be trusted to, compared with the taxis, or any thing to be done when that fails, but the operation with the knife.

I must remind you, however, that in hernia, and especially in large hernia, there is sometimes an opposition to reduction from the condition of the bowels within the abdomen. It is in such cases that the apothecary's practice—clysters and purgatives—may be of advantage: but when there is a small hard knob in the groin, let nothing come in competition with the surgeon's hand.

But let us proceed to our cases.

Femoral Hernia.

Case I.—A. D., 64 years of age, mother of nine children, was admitted into Bird's ward, on the afternoon of July 5th, with symptoms of strangulated hernia. A swelling was found in each groin; that in the right large, soft, of irregular form, yielding to the pressure of the hand with a croaking noise, but not entirely disappearing, and receiving a great impulse on coughing; that of the left side, the size of a large walnut, tense, incompressible, and receiving no impulse from coughing.—(No. 1.) Neither swelling was painful: the first mentioned had existed for fourteen or fifteen years, she thinks it has never gone entirely up, and she has not suffered inconvenience from it; the last, first showed itself seven years ago when she was making some exertion, and has occasionally come down, but never until now having been more than an hour and a half down, but going up on pressure, and sometimes not reappearing for four or five weeks. Last night the swelling in the left groin reappeared while she was ironing, and as usual when it descended she was attacked with sickness and vomiting, which, as she did not succeed in reducing it, continued during the night; this forenoon she sent for a surgeon, who ordered her to come into the hospital.

For three hours subsequent to her admission she had no symptoms; then she was attacked with vomiting, and soon after began to complain of pain in the belly. The taxis being tried without effect, twenty ounces of blood were taken from the arm; and the reduction being again attempted without success, the operation was resorted to twenty-nine hours after the descent of the rupture.—(No. 2.) The sac contained a little reddish serum, a portion of omentum, and underneath this a piece of bowel, the size of a large cherry, of a dark red, almost chocolate colour.—(No. 3.) The stricture being divided, the gut and part of the omentum were returned. Immediately after the operation, a large enema of warm water was given, and two hours subsequently, ten ounces of blood were taken from the arm. Early in the following morning, the patient began to take small doses of sulphate of magnesia, and at noon she had seven grains of extract of colocynth, two of calomel, and three of extract of conium, in pill, which produced free evacuation from the bowels. In the evening, twenty leeches were applied to the abdomen. From this time, with the exception of some pain she one day experienced from an error in diet, and which yielded to one application of leeches and a dose of castor oil, she had not an unfavourable symptom.

(No. 1.)—I shall not detain you long here, but just remind you that you have, in this description, the distinctions marked which have been, rather incorrectly, called chronic and acute hernia. You see at once, that what is called the acute hernia results entirely from a mechanical cause: it is a small, round, hard tumour, which receives no impulse from within, owing to the closeness of

the stricture: and you distinguish it from the large lax tumour, with an open or wide neck, through which the abdominal impulse is conveyed.

(No. 2.)—"Twenty-nine hours after the descent of the rupture." Gentlemen, you must put no value upon this fact; it informs you of nothing. The mischief may be done in an hour as well as in twenty-nine hours. The lesson you receive is, that there must be no delay after the proper means have been tried to reduce the tumour.

(No. 3.)—This small cherry-like portion of intestine marks the condition of the greatest danger in hernia. After the constriction of the veins has produced this dark colour, secretion into the interior of the gut and effusion between the coats come on very rapidly, complete the strangulation, and mortification must immediately follow.

Inguinal Hernia.

Case II.—James Turner, æt. 50: August 1, 1832. He has been subject to hernia for many years, but has always been able to return it when it came down: he has generally worn a truss, but latterly has not, on account of the spring being broken.—(No. 4.) The rupture came down yesterday afternoon, since which he has not been able to return it. He was admitted into the hospital at twelve o'clock this morning, previously to which he had seen some medical man, who tried the taxis two or three times, but without avail. The tumour was acutely painful, so that very little time was spent in trying the taxis; he said he had vomited frequently before he came into the hospital, but did not do so afterwards. His bowels had not been open since the rupture came down. There was pain in the abdomen, in the region above the hernia. A consultation was called, and the operation decided upon, and was immediately performed. An incision was made over the tumour, about three inches in length; and, after some dissection, the sac was laid open: it was found to contain a large quantity of fluid; some also came from within the abdomen.—(No. 5.) The portion of intestine that had descended was about six inches in length, and of very good colour. The stricture was remarkably small: it was divided upwards, and inclining rather outwards. One circumstance not attending the operation in general was, the acute pain which this patient suffered during the whole operation: dividing the different layers of membrane gave severe pain, as also did the division of the stricture. There was no omentum in the sac. The edges of the skin were brought together by two sutures, and a compress and bandage applied.—(No. 6.) A large enema of warm water and gruel was administered, which returned mixed with fecal matter. The bowels were twice open afterwards. He also took a calomel and opium pill every six hours; and a drink of barley-water, Epsom salts, and lemon juice. Towards evening

there appeared to be more pain in the belly, above the hernia, for which twenty leeches were applied, which relieved him.

2d.—He passed a good night; the pulse was 64, and it has not risen since the operation; the bowels have been open four times to-day; the tongue is white, but quite moist. Towards evening, his pulse had increased greatly in strength, though not in velocity; there was also a jerk in it; he was bled to ℥xx. after which it became soft and quite compressible. He complains of more thirst than he did.

3d.—His pulse has remained quite soft since the bleeding; the tongue is moist; the bowels have been freely open to-day; in the morning there was a slight increase of pain in the abdomen, above the hernia. This was relieved by the application of sixteen leeches. The wound was dressed to-day; there was a good deal of swelling and induration about the edges, extending about the spermatic cord.

4th.—There is no increase of pain in the abdomen; his pulse remains quite soft, and tongue moist. The bowels have not acted very freely, and he had a dose of castor oil, after which they were properly opened. He did not sleep very well last night, so he had *tr. opii gtt. xx. aq. menth. pip. ℥iss.*

5th.—He did not sleep well. This morning he has more uneasiness in the wound; he has no pain in the abdomen; the pulse is quite soft; his bowels are freely open. The dressings were discontinued, and a linseed poultice was applied to the wound.

6th.—He is doing quite well. There is no pain in the abdomen; his bowels are freely open; the wound looks better.

After this he had not a bad symptom. The wound continued healing daily, and by the 24th had completely cicatrized.

Remarks.—(No. 4.) You will remember that a person who has worn a truss, to the effect of nearly closing the ring, comes into a condition of great danger when the gut does descend. There is a narrowness of the passage, and a sharpness of the edge of the stricture, which gives to the accidental descent of the intestine all the characters of the “acute” hernia.

(No. 5.)—Your prognosis will be very much directed by this secretion. A certain quantity of serous effusion is a necessary consequence of incarceration; and when this is limpid, it is favourable. But we must distinguish the effusion into the sac from the serum which flows from the abdominal cavity after the reduction of the intestine. The latter implies that the viscera within the abdomen have suffered high excitement, and when it is in large quantity, it is a very unfavourable symptom. A case occurred during the summer, which no doubt you recollect, in a woman: when the finger was withdrawn, after reducing the intestine, the serum flowed as water from a cask. She died, and yet the intestine within the sac promised a favourable result. I remember a gentleman standing by, saying, “Well, if that intestine does not recover, I do not

know when we are to expect success ;” and I then pointed out to him the quantity of serum as the very worst symptom.

(No. 6.)—As to this pain from the cutting of tendinous parts, we cannot depend much on the expression of the patient. He certainly complained a great deal during the operation, but he was as remarkably merry after it. I do not remember to have seen a patient operated on, who was in actual danger, as this man was, of forcing all down again, by a hearty fit of laughing.

Femoral Hernia.

Case III.—S. B., 29 years of age, walked into the hospital on the afternoon of Sunday, August 12th, complaining of having had severe sickness and vomiting the two preceding days. Admitted by the apothecary into one of the physicians' wards: that gentleman, on investigating her case, detected a small swelling in the right groin, and suspecting that this might have some connection with her complaints, he requested the surgeon of the week to see her. From her statement it appeared that she had noticed a small kernel in the situation just mentioned, for the last three years; that, on the afternoon of Friday last, whilst she was occupied in her avocations as housemaid, she felt it get larger, and that soon afterwards she was attacked with severe twinging pain in the belly. A calomel pill, and some gruel which she took, were rejected by vomiting. In the course of the night she had a scanty scybalous motion. On the morning of Saturday some pills and a draught were administered, but not retained; and some castor oil, taken at six in the evening, had the same fate. Since then, she has not vomited nor had sickness; her countenance is good, and betrays no suffering, and her pulse is natural. On examining the swelling, it was found to be little larger than a hazel nut, firm and unyielding, and receiving no impulse on coughing; free from tenderness, but occupying precisely the situation of femoral hernia; there was no pain or tension of the abdomen. The taxis being tried without avail, a large clyster was administered, and another attempt made to reduce the swelling, but with as little success. Although, therefore, no urgent symptoms existed, it was now resolved to operate, from the circumstances revealed in the history of the case.

On reaching the hernial bag, or fascia propria, this was so small in size, and some blood-vessels were so distinctly ramified upon it, as to occasion a doubt if it was not the bowel.—(No. 7.) On opening the peritoneal sac a little bloody serum was evacuated, and then there was perceived a portion of bowel, not larger than the tip of the finger, of literally a black colour. The stricture was very tight, and on its being divided, about a couple of ounces of serum flowed from the cavity of the abdomen. The piece of gut was now returned within the abdomen, but it did not recede from the ring, being retained there by adhesions all round, which were not disturbed. A compress and bandage were put over the parts in the

usual way, it being determined, however, that if clear evidence of mortification should take place, these should be removed, and the bowel probably opened. As this, however, had not taken place, and as very violent inflammation existed, blood was taken from the arm immediately on the patient being replaced in bed; and as the pulse rose under this, twenty ounces were allowed to flow. A large clyster of warm water was ordered forthwith, and two grains of calomel every two hours. Five hours after the operation, the countenance for the first time showed some anxiety; twelve ounces of blood were taken from the arm, and some extract of colocynth, with calomel and conium, in pills, ordered.

In the morning of the 13th the bowels had not been acted upon; the belly was soft, and free from pain; yet, as there was some sharpness of pulse, ten ounces of blood were taken by venesection, and fifteen leeches applied to the abdomen. The colocynth pills were repeated, and again at 2 P. M. At 6, half an ounce of castor oil was given, which at 10 o'clock—that is, 30 hours after the operation—produced the first motion from the bowels. Copious evacuations followed. The case proceeded favourably; but on the morning of the 17th, the lint covering the wound was observed to be tinged yellow, and on removing this, a small quantity of a similar coloured fluid was seen to come from the wound. Firm pressure was made upon the aperture by a compress and roller; half an ounce of castor oil was taken, and a large enema given. If any severe griping succeeded the exhibition of the castor oil, the compress was directed to be removed; but this was not called for, the patient had a free evacuation per anum.

On the 18th, bilious fluid in an increased quantity had flowed from the wound, owing in a great measure to the compress having shifted, and the difficulty of applying pressure by means of a roller. To remedy this, and as there was evidently a free passage in the natural course of the intestinal canal, a truss was applied over the compress, and by this means the discharge of bilious matter from the wound was effectually prevented. The truss was continued until the 26th, the bowels acting freely per anum on the exhibition of castor oil; when, owing to some redness and vesication of the integuments, it was left off, and large poultices applied to the wound. The discharges of bilious matter now recurred, and in considerable quantity; but in a day or two this subsided, and under the chalk dressing the integuments have assumed a healthy character. The sore is now granulating, healing, and contracting; there is still some weeping of a bilious fluid, small in quantity, and increased upon the taking an aperient, which is requisite to get the bowels to act per anum. (No. 8.)

Remarks.—(No. 7.)—You will remember that the anatomy of hernia cannot be completely studied by the dissection of the natural parts. The true sac assumes a very different appearance in the varieties of hernia. We have no time to enter fully upon this subject: yet I must remind you that the peritoneal sac of the femo-

ral hernia of women is so exceedingly thin, and the colour of the intestine shines so distinctly through it, that you are very apt to mistake it for the intestine, and to reduce it with the gut. The circumstance noticed in this case, of the resemblance of the fascia to the bowel, strengthens the same misapprehension. You distinguish the sac by the mode in which the vessels run upon it; and taking the tumour betwixt the finger and thumb, you can discover that it contains a fluid, and that in that fluid there is a nucleus. The dissection, however, is a very nice one.

(No. 8.)—Of the five cases which are read to you, this is by far the most interesting. I mentioned three sources of danger; and that where there was a small portion of intestine and a narrow stricture, the coats were apt to be partially cut, and afterwards to ulcerate. You see that, in this case, the general disturbance or injury to the intestinal canal within the abdomen, did not bear a proportion to the injury of the portion included in the hernia; and you accordingly observe that recovery is almost certain. You will especially mark, that when the intestine within the sac is thus exposed to ulceration and mortification, it does not lie loose: for, as inflammation accompanies the injury, it is agglutinated by coagulable lymph to the peritoneum behind the stricture. You ought not to undo this adhesion; and, on the whole, the practice here pursued by my colleague, I conceive to be just what you ought to follow. You will observe that there has not been a sloughing of the intestine, but an ulceration where it was pinched; and you will do well to mark this distinction when feculent matter is discharged after hernia.

I am inclined to believe, that in this case the whole diameter of the gut was not included in the stricture. If so, this is a very favourable circumstance, and will facilitate the process of cure, and lead us to hope that there will be here no anus at the groin. This is a subject which we shall take up at more leisure.

Femoral Hernia.

Case IV.—Rebecca Meeking was admitted July 12th, at 7 o'clock in the evening. She stated, that at 6 o'clock this morning she was seized with vomiting and pains in the bowels, when her attention was directed to a tumour in the right groin, which she says she had not observed before. She was visited shortly after by some medical man, who found that she had rupture, and endeavoured to reduce it, but without success; he also tried again this evening, but could not succeed. He then advised her to be brought to the hospital. On her admission there was found to be a femoral hernia of the right side; the tumour was about the size of a walnut. One portion of it was soft and lay over Poupart's ligament, and could be easily brought down; there was another portion much harder, situated to the inside, and below the ligament. This portion was irregular, while the other felt smooth and even. She says

that she has vomited frequently during the day. The bowels were open yesterday, but not to-day. The tumour is now very painful on pressure, and offers great resistance, all attempts to reduce it proving ineffectual. There is no pain in the abdomen; the pulse is small and weak. She had an enema, part of which returned immediately, and the remainder came away about half an hour afterwards, mixed with hardened fæces.

The surgeon of the week came to the hospital about 10 o'clock, and tried for a short time to reduce the hernia, but could not make any impression on it; it was accordingly found necessary to operate. An incision was made to the extent of about two inches over the tumour. The irregular mass felt through the skin was now exposed, which proved to be fat, and two or three small glands. About the centre there was seen to be a large vein, running up under the skin of the abdomen; this was carefully avoided. (No. 9.) After a little dissection the sac was exposed, which appeared very thin, being quite transparent; it was opened, and found to contain about 3ss of fluid. The portion of intestine was now exposed, and about the size of a large hazel nut; it was in a very good condition, though of a darker colour than natural, not having lost its shining appearance. The stricture was divided upwards and inwards, and the intestine easily returned; no omentum was contained in the sac.

The edges of the incision were brought together with adhesive plaster, and a compress and bandage applied. An enema of warm water and gruel was given, and ʒxiv. of blood taken from the arm.

13th.—She has not vomited since the operation; she got some sleep during the night; her bowels have been open once this morning; she had pain in the lower part of the abdomen, which was relieved by the application of leeches; she was ordered to take a calomel and opium pill every six hours, and a mixture containing castor oil. In the evening there was an increase of pain, and she had nine leeches applied, after which she was relieved.

16th.—She has gone on quite favourably since last report; the bowels have been open daily by taking small doses of castor oil.

After this her improvement was rapid, and she had not a bad symptom. The wound required to be poulticed for about a week, after which it was dressed, and gradually healed. She was discharged from the hospital August 14th. (No. 10.)

Remarks.—(No. 9.)—The greatest advantage of experience in a lecturer, is when he recollects what were the things which puzzled him in his early practice. In just such a case as this was my first operation performed. I well remember the difficulty I had in distinguishing the sac, and opening it. The femoral hernia, as I have had frequent occasion to observe to you, is generally very small: and over it lie the glands of the groin, with much fat, and sometimes, indeed not unfrequently, there are sacs, containing fluids, or sort of hydatid tumours, making the mass altogether irregular. I have just observed that the layers covering the peritoneum are very

smooth, and very like the proper sac ; so that this forms a piece of dissection which requires some dexterity, together with a perfect knowledge of the distinct characters belonging to the parts. You lay the glands aside, in such a manner as to make it unnecessary to divide the lymphatics of the thigh. The wounding of the vein, here spoken of, is of no consequence, further than that by covering the surfaces with blood, it may make the necessary dissection a little more difficult.

(No. 10.)—The only further observation that I will make on this case, is in regard to the direction of the bistoury in cutting the stricture. It may have appeared to the bystanders that the cut was made obliquely upwards and inwards ; but it was cut directly upwards. In these small herniæ, it is of very little moment ; for all you have to divide is just the sharp edge of that tendinous arch which stretches across the upper part of the neck of the sac : and you would do well to observe with what intention this is done ; which will afford you a measure of the extent of your incision. In such cases, you do not think of forcing in the point of your finger, but only the directory. Then passing the straight bistoury (which you see is blunt to half an inch from the point, and cuts only at one small part of its edge,) you raise the hand, separating the instruments ; and you do not draw the bistoury, as in common cutting, but raise it like a lever, the point resting on the groove of the directory. By this means, you cut only what strongly resists ; that is, the firm edge of the ligament, and, of course, a small portion of the neck of the sac. Now, when this is done, you are not at once to push up the intestine : but rather draw it a little down, and compress it, and empty it ; and always be very careful in the mode of reducing it, avoiding, as the most dangerous practice, the thrusting in of the finger into the stricture, whilst the tender part of the gut remains in its original place.

Direct Inguinal Hernia.

Case V.—On the 14th of July, at the hour of visit, the attention of the surgeon was called to the case of a man between fifty and sixty years of age, who for the last two days had had bilious, and now stercoraceous vomiting, and from whose bowels there had been no evacuation per anum for a week. He had for years had a rupture in each groin. The hernial tumour of the right side was found to be large, soft, and in its contents were felt formed fæces. With some difficulty it could be entirely reduced, descending again immediately on the pressure being withdrawn ; that of the left side was about the size of a hen's egg, tense, but yielding in some measure to pressure, which was attended with a gurgling noise ; but the swelling could not be reduced. The skin over the latter was reddened, the abdomen was distended, and the skin cold and clammy. It was feared mortification of the contents of the left hernial sac had taken place ; and on cutting into the sac, this was found to

be the case with a portion of bowel which it contained. The stricture, which was not tight, was divided directly upwards, the bowel was opened, and the edges of the incision in it attached by ligature to those of the skin. A free and copious discharge of the contents of the intestinal canal immediately took place, the tension of the abdomen subsided, but the patient survived only thirty hours.

On examination of the body, extensive inflammation of the peritoneum, with effusion of lymph, was found to have existed. The hernia operated upon was discovered to have been a direct one, passing immediately from the belly through the external ring. The epigastric artery passed upwards, on the outside of the neck of the sac; and again, on the outside of this vessel, was seen the internal ring dilated, and with a pouch of peritoneum propelled a little way through the inguinal canal; so that, if the man had lived, it seemed as if he might have had a hernia passing in the usual way through this canal, in addition to the direct one operated upon, the epigastric artery passing up between the openings of the two sacs.

The hernial tumour of the right side was formed principally of the caput cœcum; it was not included in a sac; and although a sac did exist, this lay on the anterior part of the bowel only, and contained nothing. The posterior and inferior parts of the gut were covered by loose cellular substance. The intestine contained in the direct hernia of the left side had been the lower part of the ileum, close to the cœcum.

This case showed the advantage of the rule of operating in inguinal hernia, by dividing the stricture directly upwards, which had been done in this case, and yet the incision had not touched the epigastric artery.--(No. 11.)

(No. 11.)—We have been observing that the incision of the stricture should be made directly upwards. In this hernia (the bubonocœle) there is an additional reason for this practice, since it is not always clear whether the case be one of direct or oblique hernia: and you have here had it demonstrated that in the one the artery lies on the outside, and in the other on the inside; while in both, it is close upon the neck of the sac; so that if, in the direct hernia, the surgeon had cut obliquely upwards and outwards, the artery would have been in danger: and the same danger would have been incurred if, in the other, he had cut obliquely upwards and inwards. Thus you have the reason of the rule to cut directly upwards in every case.

Case of Scrotal Hernia—The Stricture in the mouth of the Sac.

Wm. Cooper, æt. 47, was brought to the hospital at five o'clock in the morning of the 10th of February, by a surgeon who had previously attended him. He had a scrotal hernia on the right side, which, on his being placed in bed, was reduced with the greatest ease.

It was then stated, that the patient had been subject to hernia for

28 bell

twenty years ; that it had come down five years ago, and there had been some difficulty in reducing it. After that time he wore a truss, but continued the use of it for a short time only. On Thursday last (the 7th), in the evening, his rupture again came down ; he felt sick, and took a black draught, which he vomited. Next day he sent for a chemist, who made several attempts to reduce the hernia ; upon his not succeeding, he confessed that he had not much experience in these cases, and left the patient. About two o'clock in the afternoon, he was seen by the surgeon who accompanied him to the hospital. This gentleman succeeded in reducing the hernia ; so that the tumour disappeared, and he could even push the point of his finger into the external abdominal ring. The patient expressed himself greatly relieved after this operation. He obtained no evacuation from his bowels however, from the time that the hernia came down until he was conveyed to the hospital. This surgeon gave him, in separate doses, to the amount of fifty grains of compound extract of colocynth, and sixteen grains of calomel, and several injections by the rectum. He also bled him, soon after the operation, to twenty ounces.

When brought to the hospital, his condition showed that he was in a state of great danger. He had constant vomiting ; his abdomen was swelled and tympanitic, and exquisitely tender to the touch, particularly at the lower part, on the right side ; he had a small, quick, almost a fluttering pulse ; his features were sunk and pallid. The house-surgeon ordered him a dose of castor-oil, with laudanum, and a clyster. When visited at ten o'clock he had had three motions, and expressed himself as being a great deal better, and quite easy. His pulse was fuller. During the greater part of the day, he continued to feel easier than he had hitherto been. But about six o'clock in the evening, it was found that his extremities were cold and damp ; he was restless, complaining of pain in his abdomen. He died that night. It is to be remarked, that the hernia came down repeatedly during the day, and was each time reduced with great facility.

Dissection.—The hernia was in the scrotum : it had come down shortly before death. Upon cutting through the abdominal muscles, the intestines rolled out from the incision, being distended with flatus. All the small intestines were highly inflamed, distended to the utmost, and, in some parts, loaded with dark fluid contents. The portion of gut which was included in the hernial sac was a knuckle of the *intestinum ileum*, very near its termination in the *cæcum*. Above the stricture, the intestine was of a deep-red colour, marked with several patches of an inky blackness, and it was loaded with dark offensive fluid. On turning these coils aside, the lower portion of the *ileum*, leading from the hernia towards the *cæcum*, was seen small and contracted ; its folds being in a mass together. These were of a pale green colour, and their surfaces were marked here and there with dark mortified spots. In the colon there was nothing to remark, except that it was contracted, and that it had

not partaken of the inflammation. There was a large duplicature of the transverse arch, with a thickened mass of omentum attached to it, which appeared, from its form and the old adhesions that united it, to be the portion which had been reduced five years ago, when the rupture had come down.

On examining the contents of the hernial sac, there was a fold of distended mortified gut included within it. The coats were here of a dark brown, and in some places of a perfectly black colour: they were thicker and more pulpy than natural. Where the stricture was, the gut appeared soft, as if it were about to ulcerate. Around the neck of the sac, which formed the stricture, there hung a fold of the perineum upon the inside, which was loose, resembling an empty bag. Upon squeezing the strangulated portion of intestine, evacuating some of the air which distended it, and then reducing it, it was found that the intestine could very easily and effectually be pushed through the external abdominal ring, so as to be hid from the sight. On looking to the inside, however, it was seen that the portion of gut had carried the neck of the sac before it into the abdominal cavity; and the duplicature of the peritoneum, which has been described, being unfolded, had formed a new sac for including the knuckle of intestine, on the inside of the abdominal muscles. Thus the fold of intestine was pushed through the external abdominal ring, through the spermatic canal, and through that part which is described to be an internal ring (but of which ring no trace could be seen), and was reduced with the abdominal muscles: but not within the abdominal cavity. The neck of the sac had been torn off from the internal ring, in the effort of reduction, but continued to grasp the included portion of gut.

Case of Congenital Hernia; a second portion coming down producing Strangulation.

William Heath, æt. 40, a tall, muscular man, was brought to the hospital on Saturday, June 14th, at 9 o'clock p. m. having a large scrotal hernia on the left side. He has been subject to hernia for six years, and has worn a truss for the last four years. He says it was originally produced by the kick of a horse. It has come down only once since that time, and that was two years ago: it was then easily reduced. To-day, about half-past four, while riding, his horse made a sudden spring, which threw him off the saddle; at that moment he felt something give way in his groin, and he discovered that his rupture had come down: his truss was on at the time. A surgeon attempted for about half an hour to reduce the hernia, but failing, he sent him to the hospital.

The appearance of the tumour was peculiar. It distended one side of the scrotum, but it occupied considerably more of the groin than is common; the upper part had a remarkable squareness, owing to a projection of the tumour, which extended obliquely across, towards the ileum, passing the abdominal ring. This part

he felt hard and inelastic, and the integuments were abraded and slightly inflamed over it. The lower part of the tumour was more compressible, as if it contained flatus, or serum. He had nausea and frequent vomiting, which did not appear, however, to be ster-coraceous: he suffered violent pain in the lower part of his abdomen, and writhed about in bed: his pulse was small and sharp, about 60; and the countenance anxious. The taxis, from which the patient suffered great pain, having been persevered in without effect, Mr. Bell was sent for, who, after attempting reduction for a very few minutes, called a consultation. In the mean time, the patient was put into the warm bath, where the taxis was again gently tried, but with similar want of success. It was remarked, when he was brought back to bed, after having been in the bath, that the tumour, instead of being diminished by the operation of the taxis, was very considerably increased in size.

Operation.—12 o'clock. An incision, in a semicircular direction, three inches in length, was made opposite to the neck of the tumour. Three successive layers of fascia being raised, the sac appeared, perfectly transparent, and its contents dark coloured. A projection, like a cul-de-sac, extended under the integuments of the groin. A dissection was then made to clear the neck of the sac; and the upper pillar of the external abdominal ring was exposed. The sac was opened, and about five ounces of bloody serum spouted out. The directory being passed in at the opening, and the sac slit up, a portion of intestine, of a bright vermilion colour, presented itself, and there was seen, occupying the larger portion of the scrotum, a part of the intestine, distinguishable from that first exposed by its colour; it was of a dark lake, or bluish tint; in short, it had the colour of venous blood. When the folds of intestine were reduced, the testis was seen projecting on the back part of the inner surface of the sac, showing that the hernia was congenital.

Almost immediately after the operation, he fell asleep. Pulse 56, small. Hydrarg. submur. gr. iii.; pulv. opii, gr. i. The calomel to be continued every three hours. At four o'clock he was bled to ℥viii. as the pulse had risen.

Sunday, 15th.—Noon. The bowels have not been opened. He has had three clysters in the course of the morning. Pulse 84. Tongue clean. Skin hot. No thirst.—Evening. After taking an ounce of castor oil, his bowels were freely opened; and he expressed himself much relieved. He was bled to ℥xiv.

Monday, 16th.—He has had copious evacuations of the bowels. Early this morning he was bled to ℥xvi. The abdomen is distended; there is tenderness on pressure upon the left side of the umbilicus; and he is unwilling to move, but he expresses himself comfortable; and he sleeps a great deal. Twenty leeches to be applied to the abdomen.—Evening. His bowels have again been opened; the evacuations are of a fluid consistence. About six o'clock he had a slight vomiting, which returned a few minutes ago; it appeared to be the toast and water which he had swallowed that was returned.

About three hours ago his pulse began to intermit: now it intermits irregularly, and at the same time is quick and thrilling. His abdomen is distended and hard. When it is pressed, he winces; yet, he says, he feels quite easy. The respiration short and quick: the skin soft and perspiring. The leeches and fomentations to the belly to be repeated: he is to take the calomel and opium pill.

17th.—Pulse 128. Although all the symptoms are aggravated, he expresses himself as more comfortable. The fomentations continued. A large blister to be applied near the umbilicus.—Evening. He has vomited frequently a dark coloured fluid, which is very offensive. His voice is in a whisper; the abdomen more tympanitic; a cold perspiration on his face. He complains of no pain. At 5 o'clock on the morning of the 18th he expired.

Dissection: 30 hours after death. The abdominal cavity being exposed, four folds of intestine were found agglutinated together, and these converged towards the neck of the sac. On pulling them aside, the mass of intestines that had been in the herniary sac was seen: it was black, and had the appearance of being sphacelated; but when examined with the fingers, the coats of the intestines seemed of a natural consistence. In the neighbourhood of the sac the intestines adhered to the abdominal parietes, the peritoneal lining of which had a dull opaque colour, with ridges of coagulated lymph upon it, marking the convolutions of the intestines. The intestines above the part which had been down in the herniary sac, were distended principally with flatus: the large intestines were empty and contracted. There was partial adhesion to the external wound. The sac contained a considerable quantity of thin purulent matter, and its surface was highly inflamed: the orifice was closed by a deposit of coagulable lymph, which was easily torn through. There was effusion of serum beneath the arachnoid membrane of the brain.

Case of Strangulated Hernia—The Tendon cut—the neck of the Sac left entire.

— G —, æt. 84, was admitted into the hospital on Friday, 12th instant, having a large scrotal hernia, which could not be reduced. He has been subject to hernia for the last twenty years, and has worn a truss. This morning at three o'clock, the tumour suddenly came down; it increased in size so as to be larger than it had ever been before, and he was unable to reduce it. He went to a surgeon, who attempted the reduction, but without success, and in the afternoon he was brought to the hospital. The tumour was large, irregular, and very tense, particularly at the upper part, where there was a distinct round swelling, like an additional lobe to the great tumour. The pillar of the ring was very distinctly marked by a deep transverse furrow. The taxis was tried, first by the house-surgeon, and afterwards by the surgeon of the week, for twenty minutes. The patient was then put into the warm bath, a

stimulating clyster was administered, and again the reduction was attempted; but nothing seemed to relieve the distention of the tumour. After consultation, the operation was determined on.

An incision was made through the integuments, opposite to the neck of the sac, and the tendon of the abdominal muscle was laid bare. A small puncture was then made into the neck of the sac, just large enough to admit the directory; this instrument was passed up into the abdomen, but the sac was not slit up. The bistoury was introduced between the tendon of the abdominal muscle and the peritoneum, and the upper edge of the pillar of the ring was divided—it tore audibly on the slightest touch of the instrument. So great was the tension, that the moment this was done a noise was heard in the tumour, obviously produced by the flatus from the portion of intestine in the sac passing into that which was in the abdomen. A little more dissection of the ring was made, and then slight pressure on the scrotum caused the whole of the contents to slip up into the abdomen. After the intestine was reduced, a very large quantity of limpid fluid spouted from the puncture in the sac. The wound was dressed in the usual way. Forty drops of laudanum were given in warm wine and water, and a purgative clyster was administered.

Gentlemen, this is a case too important to be passed over: it has extensive bearings upon the important and ever-returning question:—What is the time, and what is the mode of performing the operation for hernia?

When I last drew your attention to the subject, it was to mark the peculiarities that attend the large scrotal hernia. I shall continue this subject to-night, and it is particularly necessary for you to bear in mind that my remarks are limited to that form of the complaint,—the large scrotal hernia, for the most part occurring in old men. You have seen that the common mode of operation is attended with certain and obvious inconveniences—that when the knife is drawn extensively along the whole face of the tumour, and the sac is opened to the same extent, the intestines evolve themselves in a very surprising manner, as if the whole bowels were turning out of the abdomen. This is the consequence of the pressure being taken off by the opening of the sac: and now begins a labour which is for some time ineffectual, of restraining and emptying these intestines: the surgeon following the old rule of reducing that portion which last came down, attempts to push up the intestines near the ring; he introduces, therefore, his finger through the ring, necessarily squeezing or compressing the gut, and each inch of the intestine, successively, is submitted to a sort of kneading process. This is necessarily tedious; the intestines are long exposed, they are thoroughly handled, and each particular portion pinched, the natural consequence of which is a fatal result. Dissection confirms us in our notion of the cause of failure here, for when the abdomen is exposed we see a mass of inflamed intestines, for the most part glued together by coagulated lymph, at all events distin-

guishable from the rest by the hues of inflammation or of mortification, and these can be recognised as the parts which we had seen handled in the operation during the patient's life.

We find in this patient the common circumstances attending the strangulation of a large hernia, coming down from time to time, and reducible. But it happens on some occasions that an additional portion or knuckle of the intestine is forced down by the side of that which commonly occupies the sac, and this portion runs rapidly into strangulation, or, at least, becomes filled, so that the reduction is rendered difficult. I believe that this took place in the present instance, from that part of the narrative which describes a small tumour near the neck, and distinguishable from the general convexity.

With respect to the mode of operating in hernia, you will observe that this ought to vary according to the difference in the size of the tumour. If you are describing the operation of a surgeon on a small hernia, you would say that he drew his knife over the whole tumour, from the top to the bottom. But wherefore is it that he does this? It is because, unless he make an incision of a certain length, he cannot prosecute the last part of the operation—he cannot divide the stricture. When the tumour, on the other hand, extends seven or eight inches, to make the incision all the length of it, betrays that the surgeon has no distinct notion of the object of this part of the operation. It may enable the bystanders to say that they have seen the operation very well—that the intestine and the omentum were displayed very distinctly; but how stands this in reference to the patient? Ought there to be this display? There ought not; you should see very little,—that is to say, an incision from three to four inches in length, opposite to the neck of the hernia; a neat dissection of the upper pillar of the ring; and an investigation made whether the stricture results from the embracing of the tendon. When the surgeon has arrived at this stage, the operation may be prosecuted in two ways: the sac may be punctured near its neck, the directory introduced from this into the abdomen, and the stricture cut from within; or, the firmer fasciæ, which are around the neck of the sac, and the upper margin of the ring, may be lifted by the directory in succession, and divided until only the proper peritoneum, thin and almost transparent, is between you and the intestine, the stricture being thus removed, and nothing but the elastic peritoneum remaining, the scrotum may be grasped, the contents of the gut squeezed out, and the hernia reduced. In either mode of operating, the advantages are these: that you do not permit the exposure and evolving of the gut—you have not the distended intestines among your hands—they are not submitted to that *handling* which I conceive to be so dangerous; and if it should so happen that the mouth of the sac is large, and the intestines apt to slip down again, they do not lie exposed in the wound, but only slip again into the sac.

If I were treating this question in a general lecture, the inquiry

would assume a speculative character: it might be said, that the stricture is so incorporated with the proper sac that it can never be dissected off its mouth. But see what has occurred in the present instance,—no sooner was the margin of the pillar divided by the bistoury, than the pent-up flatus was released, and the croaking of the intestine gave token of relief. Again, it may be said, that you may reduce the intestine in an improper state for reduction. Now the matter stands practically thus: You are endeavouring all you can by the taxis to reduce the intestine; you find from the form of the neck and the abrupt notching of it by a cross band, that you cannot succeed. You say, if it were not for that, I should succeed in the operation of the taxis; you try it again and fail. In ten minutes from that failure, you may have the stricture undone, and the cause of strangulation removed; and why not then reduce the intestine?—because it may be in a state unfit for reduction! Does not, then, the objection apply to the last steps of the taxis? Indeed, I believe that, practically speaking, this is no objection at all; or, if it be, the advantages are greater, inasmuch as the operation is rendered more simple, is attended with less danger, and therefore may be had recourse to earlier. This is not a new mode of operating; read the chapter on this subject in Petit's works: it was recommended also by Dr. Monro; and the latter claimed the original idea: his object in it, however, was very explicitly declared to be the exclusion of air from the *shut sac*, to which he attributed all the mischief in unsuccessful cases of hernia. As a general rule of operating, I should say it was exceptionable, and I, therefore, once more remind you that I am speaking of the large scrotal, or indeed of any large hernia. Let the rule be this, that you make your dissection—for I call it a dissection—on the neck of the sac, and not on the most prominent part of the tumour: that you divide the transverse fibres of the fascia, and the edge of the upper pillars of the ring; that failing in this manner to relieve the gut, you puncture the sac near the stricture, introduce your directory, and divide the sharp edge of the stricture from within. To this there can be no objection, because you see the surface of the intestine, although you do not largely expose it, and you have the jet of serous fluid from the sac; which two circumstances will give you sufficient token of the condition of the gut.

Hernia into the Labium.

Gentlemen, I am tempted to continue the subject of last night's clinical lecture, because a woman has since been brought to the hospital suffering from hernia, and in circumstances which further illustrate our subject. This patient was sixty years of age. She had a labial hernia; that is, you know, a hernia descending through the abdominal ring, and gradually falling into the labium, as the inguinal hernia drops into the scrotum. She has been subject to rupture for twenty years. No truss has been used. When brought

into the hospital, strangulation had continued for thirty hours. The tumour was incompressible. The general symptoms were shivering, vomiting, and tenderness of the abdomen, notwithstanding several stools had been procured by injections. The usual processes were had recourse to; reduction was attempted by the taxis; she was bled, put into the warm bath, had clysters, and again the taxis was employed, but ineffectually.

Observe now, what occurred during the operation in this case, and mark the contrast with the former. The neck of the sac being disclosed, the ring of the abdominal muscle was found to be loose or free. The sac was opened; and immediately a vast quantity of serum was ejected from it. The intestine, far from being distended, lay flat within the sac. It was dark-coloured, and had a coating of lymph upon it. The finger was used as the directory: it could be passed through the external ring, and the stricture was found to be in the internal ring. It was divided, the finger being within the sac, and the directory used to guide the bistoury. This morning the report was most favourable: she had copious stools, all tenderness of the belly was gone, and the tongue was clean.

First, I ought to remind you, that when we say the intestine had been strangulated for thirty hours, there must be some incorrectness in our language. I shall not attempt to explain the whole of this subject, but confine myself to one part of it.

The circumstance of this case which deserves your most earnest attention is this: You will observe that in the former case, of scrotal hernia, when the sac was punctured no fluid spouted out; but when the intestine was reduced, an abundant flow took place from the abdomen. In the present instance, the tumour was particularly tense; a great quantity of fluid escaped the moment the sac was opened: and the intestine presented a flattened appearance. These are circumstances very important in the pathology of hernia. I shall very soon show, in the regular lecture, when treating on this subject methodically, that it is the distention and gorging of the intestine, and the sudden angle which it consequently makes round the stricture, that impede the circulation, and bring on strangulation. Here, in the present instance, I believe the intestine was protected by the great pressure of the fluid which lay over it, and thus retarded the catastrophe of actual strangulation, while it made it of more easy reduction. But it is with a view to the circumstances of the former case, and the question of dividing the stricture, that I detain you to examine this. I was particular in stating, last evening, that my remarks were confined to the large scrotal hernia. In the present case, you saw that it was necessary to make the incision large in proportion to the size of the tumour; and that the stricture was not at all in the pillar of the outward ring, but in the inner abdominal ring. Hence it was that the sac was opened, and the division of the stricture made from within; the stricture being, in all probability, partly in the neck of the sac itself, and partly in the margin of the transversalis fascia.

Some further remarks on Hernia.

I proposed to-day, to make some remarks on these two cases of hernia, which you have just visited with me, both occurring in women, and in whom the operations have been successful.

Our progress in professional knowledge is not represented by a straight line: we do not move uniformly forward, but rather like a man on skates, whose efforts receive a bias, and who, after certain complimentary manœuvres to the admiring crowd, returns very nearly to the point of the circle from which he set out. You will be more sensible of this as you advance in life. In recommending you to study the anatomy of hernia, I may suggest this to you—that if you proceed in your dissection with a fine-edged scalpel, hook, and forceps, you may display all the fasciæ that have been minutely described in books, and yet remain ignorant of the exact ligament or tendon which strangulates the gut, or indeed, of the nature of those passages through which rupture takes place. Let me, then, advise you to *feel* your way here. Suppose you were in the situation which I held in early life, that of assistant to a lecturer, and that he required you to make such a hernia on the dead subject as he could operate upon,—you must make your incision into the abdomen; you get your hand into it, and pass it round the inside of Poupart's ligament, and round the pillars of the rings, in search of the internal ring; but you find no outlet. The first thing you are called on to admire is how completely—how perfectly, this lower part of the abdominal walls is closed up—how effectually it is contrived that the viscera shall not slip out by the arch under Poupart's ligament, which admits the vessels to the thigh, nor through the spermatic passage.

But being forced to make an inguinal hernia, you begin to work at that point where the vessels of the testicle or cord (scarcely yet a cord) pass through. The vessels of the testicle pass between the two portions of the transversalis fascia; and, at last, you bore in your finger, and make the passage wider and wider. What do you feel? You feel that towards the inside—that is to say, towards the pubes—you have a difficulty in enlarging the passage; you feel the sharp edge of a tendon or ligament, and that you must break it down by force, so as to bring the internal ring nearly opposite to the external one; at last, your finger slips out between the pillars of the external abdominal ring. Now this is an admirable demonstration, although there be nothing seen! You have, what is better, a distinct *feeling*—a conviction of what it is that makes the stricture, whether at the inner or the outer ring. Now you understand what I mean by recommending you to trust to the finger, or to the touch rather than to the eye.

Formerly, in my course of lectures, when I came to this subject, I was happy to speak of Sir Astley Cooper's work as one creditable to himself, to the profession, and to the country. I conceive that in

that publication the anatomy is perfect to its end; for I hold that the anatomy may be carried too far. You will say that is a strange opinion: how can it do any harm? By occupying your minds too much, to the exclusion of things more important; and I hold that the pathology of the intestine, from which the very rules of practice are drawn, is more important than the anatomy of the rings. Besides, it is quite possible, as I have seen, for students to dissect and work on the fasciæ at the groin and inside of the abdomen for the greater part of the season, to the neglect of many subjects equally important in practice. This is what I mean by saying that the anatomy may be carried too far;—it may occupy too much of your time and attention.

Now I wish that the abilities of my friend Mr. Guthrie had been directed to a different subject. By taking up this, he appears to me to be retouching a portrait that was already finished. A picture which had been carefully composed, varnished, framed, hung up, and admired, he takes down again, and retouches, and, I had almost said, daubs it with foreign colours. I am unwilling to acknowledge these foreign authorities, for, after all, their utmost merit is to have done in their own country what Sir Astley Cooper has given an example of in this. I am not about to deliver any thing new: but I have always thought, and do now think, that in consequence of the discussions concerning the parts around the sac, there has been rather a neglect of the great principles of pathology which are to be drawn from the contemplation of the gut. I have heretofore criticised freely some of the opinions in Sir Astley Cooper's great work, upon the same grounds that I would now criticise his commentator. It is conceived that the stricture, in inguinal hernia, may result from the contraction of the muscular fibres of the passage. Now I would ask you, for already you are acquainted with the data on which we reason, do you observe any difference in the symptoms of a hernia when it comes through the spermatic passage, and when it comes under Poupart's ligament; when it comes through some of the accidental rents in the abdominal walls, and is called an abdominal or ventral hernia; and when it comes through the umbilical passage, and is called *exomphalos*; or when it is an internal hernia, and passes through the diaphragm or the obturator ligament? Is there any record of symptoms to distinguish the case according to the part through which the intestine passes? Is it not, on the contrary, universally assented to and understood, that the symptoms of hernia are the same, in whatever part the disease occurs? Now you observe how this bears upon the question, because, if the symptoms of a hernia be universally the same where there are muscular fibres and where there are none, it is pretty clear that these symptoms must be attributable to something else than the muscular fibres of the ring. Why is it that the pain is always referred to the umbilicus? Because the girding of a portion of the intestine is attended with an action in the intestine itself, and the pain is first fixed in that part, and then passes round, as in colic,

attended with a twisting in the region of the umbilicus; which pain again returns to the part which is strictured, wherever the stricture may be. The irregularity, or rather the return of the pain, is the character which belongs to spasmodic action; but this spasm is not from the girdling of the stricture around the intestine, but from the action of the intestine itself: it is a muscular tube, and in it, as in all muscular parts, the pain occurs in paroxysms.

Case of Urethra ruptured from violence.

Sept. 3.—Hamlet Kemp, aged 41. This man in stepping over a gate into a field, slipped and fell, so as severely to hurt the perineum. It appears he was drunk, and continued that evening to dance. From this time he lost all power of passing urine; and when brought into the hospital, the bladder could be felt above the pubes: there was a tumour in the perineum. Into this tumour an incision was made, and a cavity was disclosed containing blood and urine. This incision relieved the urethra and the neck of the bladder, and he was enabled to make water through the wound. On the 19th, an elastic gum catheter was introduced into the bladder, through the perineum. At this time it was found impossible to pass a bougie or catheter from the extremity of the penis down to the wound in the perineum.

Operation.—It was necessary to make good the passage through the canal of the urethra, and to introduce a catheter across the wound in the perineum from the penis into the bladder. Some time was necessarily lost in attempting to dilate the urethra, or to break down the adhesions, but this was not found practicable without the knife. A catheter was introduced into the urethra, and the point steadily pressed against the obstruction. An incision was then made upon the extremity of the instrument, and the point of the instrument was thus brought out at the wound in the perineum. Some difficulty was now experienced in passing an instrument into the bladder from the wound. When this was accomplished, much care was necessary to open the communication through the urethra, between the point of the catheter and the instrument passed into the bladder from the wound. This last instrument was then withdrawn, and the catheter passed into the bladder.

Sept. 27th.—The man is doing well. He passes his urine freely through the catheter. A little comes by the side of the instrument through the wound. He does not suffer much irritation.

Oct. 8th.—He makes no water by the wound, which is now filled up, and nearly completely united.

22d.—The catheter is finally withdrawn. Nitric acid, at first diluted and then pure, was applied to the wound to hasten the granulation.

Nov. 12th.—In consequence of erection, there occurred a difficulty of passing his water. When a catheter was introduced, it met

with an obstruction. By the use of the bougie this was soon overcome, and the patient was dismissed cured.

Case of Abscess in the Perineum.

Nov. 27th.—Humphrey Robinson, æt. 50. His complaint is a difficulty of passing his urine, and that a swelling has appeared behind his scrotum. This swelling is about the size of half a lemon. It embraces that part of the spongy body of the urethra which is behind the scrotum; and is hard and slightly inflamed upon the surface. He does not dwell upon the pain or difficulty of making urine; nor is he apprehensive for himself. He is however sent into the ward, and is ordered a laxative, and a fomentation to the part.

Here follows a long account of suffering common to these cases.

This is the present state of the swelling, it is prominent, red and inflamed, and it had pointed; a little matter oozing from the ulceration. It was freely opened with a lancet. A bougie was introduced to ascertain the state of the urethra. A soft wax bougie was introduced after it was oiled, and the point of it dipped in warm water. The impression upon it, when withdrawn, showed that there was a very narrow stricture, just anterior to the part where the tumour of the perineum had taken place.

Dec. 3d.—This man says he is perfectly relieved. That he makes urine in a stream; it is however very small, and all the difficulties of the case remain. The parts in the perineum are soft and discharge kindly. No urine comes by this passage.

10th.—We missed this man from his bed this morning. He is up and moving about. From the pressure of business in the hospital there has not been so much progress in dilating the stricture as might have been expected. A bougie is to be introduced from time to time until the stricture shall admit an elastic gum catheter to be passed into the bladder. The catheter is then to be retained, and the patient to be confined to his bed.

15th.—The catheter has been introduced as recommended in the last report, and a third size is now used, a proof that the stricture has given way rapidly. The patient complains of pain and swelling in the perineum, and that the abscess which had closed is inclined to open again. This is the circumstance of most consequence to be noticed in using the catheter for the destruction of strictures. The presence of the catheter irritates the membrane of the urethra; and therefore the patient must be kept very still in bed; and every means used to keep down inflammation, and among others leeching and fomenting of the perineum. In the present instance, let it be observed whether or not the urine passes between the urethra and catheter, so as to get into the fistula; that it does so, is the opinion of the patient himself. To obviate this, let care be taken that the catheter is free and not stopped with mucus, and as the instrument gets loose in the stricture, let a larger catheter be

substituted. If the inflammation goes any length, the catheter must be withdrawn, and only introduced occasionally to draw off his urine.

17th.—The catheter has been withdrawn. A small circumscribed abscess has formed behind the scrotum. This has been opened with the lancet, and ordered to be fomented. A large catheter was introduced into the urethra. This man is agreeably surprised to find that already so large an instrument can be introduced through his stricture. The care of the dresser will now be directed to preserve the advantages which he has gained, and at the same time to permit the inflammation to subside.

Case of diseased Urethra.

——— Jones, æt. 33. This is a parallel case with the last.

Tuesday, 28th October.—To-day this man was found in the waiting-room, and recognised as a patient dismissed about three months ago, having recovered from what appeared a white-swelling of the knee-joint. He was like a dying creature, his countenance cadaverous, and his strength so exhausted that it was necessary to carry him into the ward. It was now ascertained that he suffered from obstruction of urine, and upon proposing to introduce an instrument into his bladder, he vehemently declared that it was not possible; and when the necessity of it was pressed upon him, he entreated to have the very smallest possible bougie, as he had himself in vain attempted to introduce a *wire*.

On examination, it was found that a great part of the urethra had been destroyed by ulceration; that the ulcer had eat down between the prepuce and the body of the penis. Here was a hard cicatrix, at the bottom of which the urethra opened by an orifice so small, and surrounded with such hard substance, that the point of the smallest bougie passed with difficulty.

A very small bougie was, however, passed into his bladder, and after this the smallest elastic gum-catheter was introduced; very little water was found in the bladder.

Leeches and fomentations were ordered above the pubes, and an opiate clyster to be administered. Cordials have been given. This man continued to sink and died this morning.

Dissection.—The bladder was found contracted to the form and size of an egg: the substance of it much thickened and firm. The internal coat universally inflamed: each little portion of its rugous surface was surmounted with a black spot, like black extravasated blood: a blush of redness extended generally over the surface. In these appearances we have sufficient proof that the increasing excitement and contraction of the bladder had produced the irritation and fever under which he sunk. A great part of the urethra, commencing from the point of the penis, was destroyed by ulceration, and beyond this for two inches the canal was remarkably contracted, owing to the condensation of the surrounding spongy

body; hard lines like cords were seen running longitudinally, not circularly, on the membrane of the urethra. There was a second stricture and the commencement of a false passage nearer the bladder.

Case of Urinary Fistula, showing the effects of an old neglected stricture upon the Urethra, Bladder and Kidney.

John Benson, æt. 42, February 4th, 1824. This man says he had a stricture two years ago. This was supposed to be of so trifling a nature, that the surgeon undertook to cure him in a few days. In introducing instruments he did some injury to the passage, which was followed by a great swelling of the scrotum, and this the patient represents by putting his two fists together. He says it became black and sloughed away, and the testicles were exposed. He was cured by the use of the catheter, and he described himself as perfectly well during two years until he was admitted into this hospital for a sore leg on February 4th.

About a month after that date, he perceived a swelling growing on the point of the right hip, a little behind the anus, which gave him great pain, especially at the water-closet. This was leeches and then poulticed, and it burst in about nine or ten days after he had first perceived it. He says he had no difficulty during the progress of this abscess in passing his urine. After the abscess burst, and when he made water, the urine flowed through the new sinus with force, being squirted to a considerable distance: little urine in comparison passed through the natural passage.

The smallest sized catheter could only be introduced into the bladder, it being found that there was a stricture about four and a half inches down the urethra, a little lower, he says, than the place where the stricture, which he had two years ago, was situated. Since the introduction of the catheter, no urine has escaped by the sinus in the hip. Successively, larger catheters have been introduced, and he has now one of nearly the full size. He can at present make water through the urethra, and none comes by the fistulous sinus.

REMARKS.—It would not appear from this man's own account that he had a narrow stricture, or that he suffered excessively from disorder of the urinary organs; and yet we frequently see patients suffering severely without such consequences as resulted in the present case. The truth is, that in some constitutions there is a greater proneness to abscess, and of course to urinary abscess: of which we may presume this is an example. In some of these instances we shall find ourselves baffled; for when the catheter is introduced to prevent the urine running into the abscess, and the abscess becoming a fistula by the presence of urine in it, the catheter itself becomes such a source of irritation that new abscesses are formed around the urethra, and cases have occurred in this house, and

preparations are in the Museum,¹ where the membrane of the urethra had been absorbed for a considerable part of its length, rendering a cure totally impossible. We hope for a different conclusion in this case.

In the present instance it may be a question whether the communication has been formed directly with the urethra or with an abscess making way through the prostate. On this depends his ultimate recovery; at present the man's health promises fairly.

May 22. A new abscess has formed an inch anterior to the old fistula, and nearer the anus. On the 19th it burst and continued to discharge a great quantity of pus. The skin near it is now inflamed, and there is another abscess pointing. He has ceased wearing the catheter, and makes his water freely. The report leads us to suspect that the rectum is concerned in the fistula, though the probe has not yet been passed so deep. After being long an inmate of the hospital, this patient was dismissed cured of his sore leg, and making water by the natural passage.

In November 27, 1827. This man has come back seeking to be readmitted for a fistula of the perineum anterior to the scrotum. He stated that after leaving the hospital his difficulty of making water returned. His scrotum was suddenly distended, and portions turned black and separated: finally, the parts healed, but the sinus through which he now makes water remained. In June last an operation was performed on him for the cure of this fistula, and a large sized catheter was introduced into the bladder; but the fistula did not heal. At present the sides of the sinus are hard and callous, and the probe passes directly into the urethra. There is an abundant discharge of muco-purulent matter from the urethra. An elastic gum catheter, about a medium size, was passed easily into the bladder. This was allowed to remain in the bladder, and was only withdrawn to be cleaned. After a short time it produced irritation, and had to be removed. He appeared greatly worn out in his strength: complained of pain in the loins, and had frequent desire to pass his water. At length he was seized with frequent sickness and vomiting, and he had diarrhœa alternately with constipation: his strength being in this manner exhausted, he died.

Dissection.—The bladder was remarkably thickened and hard; its coats measuring nearly three quarters of an inch: it contained about three ounces of urine. The internal surface was black as coal, yet it retained its natural smoothness. The rugæ were very distinct; a sacculus was formed close to the opening of the left ureter; but it was only of small size. The muscles of the ureters were unusually prominent. The cellular membrane around the neck of the bladder was so much condensed that it cut like leather. The prostate gland was of its natural size, but its ducts were enlarged, and one of them had obviously been preternaturally dilated by its having caught the point of the catheter, for a probe could be passed

¹ Now in the College of Surgeons here.

along it under the membrane for half an inch. The ureters were both greatly dilated, and the cellular membrane around them was condensed in all their course from the kidneys to the bladder. Both kidneys were lobulated and sacculated; and the pelvis and infundibula were much enlarged. There was some appearance in the right kidney of abscesses pointing on the external surface. The cellular membrane was remarkably condensed around them both, making it difficult to remove them.

The urethra was considerably dilated posterior to the seat of the stricture and the fistulous opening. The fistula opened immediately behind the stricture, which, when divided by the knife, was found to be nearly as hard as gristle. The stricture occupied about half an inch of the urethra. The orifice of the fistula towards the urethra was as hard and callous as the stricture, or more so.

Stricture, with lacerated Urethra and distended Bladder.

I have before me the house-surgeon's case-book, from which I am about to read. He promises me an abundance of cases of stricture, and disease of the urethra and bladder, if I will only defer the subject; but I shall be satisfied to-day with one case, which brings, I think, the whole question of practice before you, and in a very impressive manner. Before I read this case, let me beg you to consider two conditions of the bladder, apparently very distinct, and in contrast with each other, yet both proceeding from the same cause—stricture in the urethra. What, apparently, can be more distinct than a distended bladder arising above the navel, or even as far as to the scrobiculus cordis, and a bladder so contracted, that its cavity is not larger than that of a walnut, and its walls so firm and condensed, that in old surgical books it is called scirrhus of the bladder, which scirrhus I hope you understand to be, the density arising from frequent and powerful muscular contraction. These two conditions, arising from the same cause, do yet present very distinct symptoms. Is the practice, then, different? Let us inquire.

With regard to the first, viz. distention of the bladder, you have before you a case which exhibits the extraordinary torture which the patient endures from it; and you must be anxious to know what would be the result if the patient were left unassisted. There might be rupture of the bladder; and observe, the bladder may be ruptured in two ways:—If a person with a full bladder, is thrown from the top of a coach, of which we have had several instances in patients brought into this hospital, the coats may be actually ruptured, and the bladder rent from the fundus to the neck; but when rupture takes place purely from over distention, which is the case now to be considered, the appearances on dissection are these:—There is a small pin hole, or perhaps two or three small holes, with black and ragged edges, near the fundus, and the bladder itself is found relaxed and empty, whilst the abdomen is full of urine. It is not then, properly, a rupture, but something more like that ulcera-

29 bell

tion which takes place in the urethra, and lays the ground-work of fistula. It is owing to the excessive distention that ulceration takes place, so as to weaken the coats, and then the urine bursts through them. When this happens, the patient feels as if he were passing water, yet no water flows. By and by, instead of the round firm tumour which was felt in the belly, there is a general tumour, and an undulation, implying that the urine is abroad in the cavity of the peritoneum. In the mean time the patient is probably delirious, and in that case a man will put a pistol to his head, or throw himself out of the window; such cases have been narrated to me. The only instance which I remember coming under my own observation, was one where the delirium arising from this source assumed so much the character of mania, that a physician from a madhouse was brought into consultation. This was great ignorance, and to the effect of aggravating the suffering of friends; for, is it not an additional pang to be led to believe that a son, or brother, has died maniacal? Such is sometimes the condition of a person with a distended bladder unrelieved.

When there is a stricture, and a sudden obstruction comes on, distention takes place; but when there is a stricture without such sudden and abrupt obstruction to the urine, the bladder makes powerful and frequent efforts to relieve itself; and these continuing, cause a thickening of its coats, and a diminution of its cavity, and from which, of course, arises a necessity for still more frequent calls. The patient is obliged to rise sixteen or twenty times in a night; he is at last continually on his knees, with the *pot de chambre* between his legs; he makes, perhaps, half an ounce of urine at a time, and that with such continued effort, and such protracted pain, that fever and irritation arise, and he will die with effusion on his brain. Mark, then, I beg, because it leads to an important conclusion in practice, how a narrowing of the urethra, will at one time produce a sudden distention, such as we have just seen, and at another a condition of equal danger, but more insidious, in which the state of the patient is not so apparent, and yet the danger is imminent. You will readily acknowledge, that from either of these conditions a patient must be immediately relieved; that there is no time nor opportunity for gentler means; it is only an operation that can save him. I will now read the case of distended bladder.

Stricture with lacerated Urethra and the Operation.

"A man of colour, of the name of Wallis, came to the hospital about half past twelve, groaning most piteously with retention of urine. Blood was flowing from the urethra, and it appeared that a surgeon had been called, who had attempted to pass a catheter for him, but had failed; and that the attempt to relieve him by operation had been followed by a great flow of blood. The surgeon then administered a dose of castor oil and laudanum; but the attempts by manual operation failing, he bled him and sent him to the hos-

pital. When he came to the hospital, a wax bougie was passed down to the stricture and withdrawn, but no urine flowed ;"—that is a practice on which I shall make some remarks presently :—" he was therefore immediately placed in the warm bath, but still no urine flowed. The finest silver catheter was attempted to be introduced ; the point entered a very narrow stricture, but it could not be carried forwards ; and below, a little to the left of the stricture, an extensive tear was felt in the membrane of the urethra. It was only by avoiding this, and keeping the point of the catheter close to the upper part of the urethra, that the point of the catheter could be directed into the stricture. No urine came, and the bladder being now very much distended, and the fundus having risen to the navel, was as tense as a tennis-ball." Such was his condition ; and the narrative goes on to state—" that it was about twenty years ago that this man first suffered from an obstruction of urine ; that he was then on a voyage to China, and, if we understood him aright, the water was drawn off by the use of a bougie. For several months past he has suffered much from stricture ; he was obliged to rise frequently in the night, and on making water, it flowed in a very small stream. When he did desire to make water, if he did not immediately attend to the call, it would come away only in drops ; however, up to this time he had always been able to do without an instrument, till the morning in which he was brought to the hospital.

" The case was becoming very serious, and the surgeon of the week was asked to see him whilst in the warm bath. He ordered him to be put between blankets, and carried to bed ; and he then attempted to procure an impression with a soft bougie of the state of the stricture. He then introduced the catheter, but said he felt the point of the instrument out of the canal. A consultation was then held, and the attempt was made to pass two or three catheters of different sizes and curves, but in vain. On examining per anum (the house-surgeon continues to state) the lobes of the prostate were felt distinctly, the gland healthy, the bladder tense in front. In the consultation, the question was mooted, whether the bladder should be punctured by the rectum, or the membranous part of the urethra opened from the perineum. The only objection to the latter method was the possible difficulty of introducing the catheter from the wound into the bladder, and the possibility, therefore, of the sphincter of the bladder still resisting, and the bladder remaining distended. It was determined that the latter operation should be performed ; but if there were great difficulty of passing the catheter, that the bladder should be punctured in the wound, as it was declared necessary to relieve the patient immediately."

Now the house-surgeon has properly put down "*instruments prepared for the operation*—lithotomy-tapes, elastic catheter, grooved sounds, directories, probes, sharp-pointed bistoury, tenaculum, bandage around the waist, trocar." In preparing to perform an operation, you ought to have every thing that can by any possibility be

required. It is an unpleasant occurrence to be foiled in the first attempt, and then have to call for instruments which are not forthcoming, and which show that something has occurred unexpectedly, and for which no preparation has been made.

"The patient was taken into the theatre, and placed on the table in the posture for lithotomy, and secured in the usual way. The finger of the left hand was introduced into the anus, and the point of a sharp pointed bistoury was thrust through the skin, about half an inch in front of the anus, exactly in the central line. It was carried at once into the membranous portion; the handle being then depressed, the point was pushed on, so as to come out through the skin, about an inch and a half in front of the part where it entered. By this the corpus spongiosum of the bulb must have been cut. The moment the bistoury cut itself out, a gush of urine followed, which covered the operator. The moaning of the patient immediately ceased; he seemed already relieved. After a time the catheter was put into the wound, and slipped at once, with the greatest ease, into the bladder. The whole operation together did not occupy half a minute. The urine continued flowing in a full stream, and about two quarts were evacuated through the tube. There was some arterial bleeding; but the loss of a little blood was considered as an advantage. The catheter was secured in the bladder, and the patient sent to bed. The surgeon, clapping him on the shoulder, said, 'Now my man, you shall go to bed, and have an opiate, and be comfortable;' on which he thrust his head out of the blanket, saying, 'Sir, I am in heaven,' and drew it in again like a tortoise. His relief was so perfect, that he presently *fell asleep on the table.*" Was this really so, gentlemen? I was obliged to leave him, and knew not the circumstance: however, nothing can so fully demonstrate his previous suffering and exhaustion, and the complete relief. For my own part, I have never seen this, except where I have operated on the trachea.

"When he became warm in bed, the bleeding increased considerably; and in a quarter of an hour he bled to sixteen ounces: it was arterial, and came by jets, but after the house-surgeon had searched some time, no vessel was found. It could only be commanded by placing the finger on the cut through the bulb. A small ball of lint, with a string attached to it, was placed there, another larger one over it, then a piece of sponge, and two large compresses, with a bandage over the whole; and this completely commanded the bleeding, without obstructing the catheter. The wire was passed to ensure that the catheter was quite clear. The pulse strong, and full enough. He had lost about twenty ounces of blood.

"Eleven p. m.—No more bleeding; the stilette again passed; all but the two lower compresses removed, for fear of too much obstruction to the urine, and that the catheter should get choked in the night, and so inject all the cellular membrane.

"31st.—Passed a good night; pulse full, rather variable; no pain

in the abdomen; urine trickles freely from the instrument as it is secreted. Poultrice to the wound."

REMARKS.—1. Now you have heard the case, and you will not accuse me of a want of decision, nor an unwillingness to operate when the occasion calls, on any idea of the difficulty to be encountered; and therefore I take this opportunity of strongly impressing upon your mind, that if I seem unwilling at any time to operate, it is from another reason, than any distrust of my hand. And further, I take the opportunity to assure you, that though you have seen me, with a knife, cut at once into the perineum, yet in general practice, gentlemen, perseverance, repeated slighter efforts, are the sure modes of curing stricture in the urethra; and not one case in five hundred requires any such means of relief. True it is, the time may come when you require decision and a bold operation, such as you have seen me forced to perform; and as it may become necessary, you ought to prepare yourselves for its performance. But if time be afforded for gentle means, they are much to be preferred, and are surer to be successful;—I mean in cases where the stricture has not been abused.

2. The next question that arises is, what is the nature of this obstruction? Is it altogether mechanical, or is it partly mechanical and partly nervous or spasmodic? You must remember, that if a person have his bladder surcharged, though there be no obstruction at all, it will cease to act. I have this morning drawn off two quarts of water from a gentleman's bladder, where there was no difficulty whatever in passing the largest catheter, for I used the largest catheter purposely; but the bladder had been over distended, and consequent upon that there was paralysis—or at least, if not paralysis, a want of consent between the detrusor of the bladder and the muscles in the perineum. You no doubt remember that the neck of the bladder and the urethra have around them the compressor prostatae, levator urethrae, and the ejaculator seminis, besides the columns of the levator ani. All these muscles must relax before a drop of urine comes, and any spasmodic action in them directly obstructs the passage, whilst it hinders the contraction of the bladder itself. The contraction of the one set of fibres, and the relaxation of the other, belong to the same act, like the condition of opposing muscles in the motions of the limbs; so that if the bladder be not in a state to execute its functions, these muscles are not in a condition to relax. It would be easy to illustrate this by the state of the stomach, the rectum, the uterus, or any hollow viscus. When a man has a stricture, and passes his urine with difficulty, being in the condition that this case describes—that is to say, unless he immediately attends to the call to make water—he will soon be unable to void it at all: he is liable to have his bladder surcharged; and no sooner does it become distended, than the fibres at the cervix become spasmodic. Then the bladder fills more and more, till it rises, and may be felt in the abdomen, and so it may rise to the umbilicus, or even to the scrobiculus cordis. You perceive then, that

although the original cause—the stricture—be a mechanical obstruction, there is superadded a cause *spasmodic*; and it is the management of this spasm that demands your attention—not the immediate cure of the *stricture*. This is the reason why the soft bougie was used, as the man describes in his case, and why it was again attempted when he was brought into the house. By passing the wax bougie, with the end softened, into the stricture, letting it remain there, and slowly withdrawing it, calling upon the patient at the same time to make an effort, and gently pressing the abdomen, the urine will sometimes flow; and when it once begins to do so, it continues. You understand, also, that it is for the same reason that the patient is bled, and put into the bath, and has a strong opiate administered.

3. It is a common question with us, when examining whether a pupil or a dresser be fit to be made house-surgeon, to ask, what he would do when a man comes in with obstruction of urine? You see how necessary it is that he should be perfectly aware of what ought to be done, because such cases are occurring almost every day; and if he makes a mistake, and passes a catheter at an improper time, the case before us declares with sufficient emphasis, what are the unhappy consequences. It is expected he should reply, “I would consider from what the obstruction proceeded. If he were an old man of seventy that presented himself, I should suspect the prostate, and examine that first, to see if it were enlarged. If he were a young man, I should ask him if he had been the subject of gonorrhœa, of discharge from the urethra, and if the discharge had been suddenly suppressed,” because when the inflammation of gonorrhœa is suddenly checked, that inflammation has shifted backwards; the discharge has not merely ceased, but the inflammation of the urethra has increased, and very often it is the violence of the inflammation which stops the secretion. There is a certain degree of inflammation which promotes discharge, but a little less or a little more suspends it; and when gonorrhœal inflammation has increased to a considerable degree and crept back to the neck of the bladder, pain and spasm take place of the discharge. We should therefore require the house-surgeon to consider whether the obstruction arise from inflammation, and consequently spasm and impediment to the action of the bladder, or to stricture. I should expect him to say, “I must consider whether the patient has not got a stricture, for although I might draw off the water from an old man with an enlarged prostate, yet I am aware of the danger of attempting the same mode of relief where there is a narrow and irritable stricture;” and I should expect him to add, “whichever of these three causes the distress arose from, I would be careful in passing the catheter.” As surgeon to a public institution, I should especially require attention to ascertain the nature of the obstruction, with reference to these three questions, before I would say he was a safe man.

4. In such a case, then, as I have read, where the history tells

us there is a stricture, and the surgeon who first attempted to overcome it has ruptured the urethra by allowing the point of the instrument to get out of the right canal, we are precluded from doing those delicate operations which require repetition, and therefore time, to be effectual. When the point of the catheter has lacerated the membrane of the urethra anterior to the stricture, there the bougie will hitch and fall on every repetition; so that you are not only prevented from gradual dilatation, but even from that milder mode—gentle insinuation of the bougie, in order to induce relaxation of the spasm. Now comes the question home to us: where the bladder is rising, the torture extreme, and delirium is coming on, what is to be done? Is the bladder to be punctured, or are you to perform an operation on the perineum? I would say, the bladder is not to be punctured unless in some extreme cases, where the patient is so far gone from distention and inflammation, accompanied with long continued agony, that a little further delay will destroy him; and where he has not only suffered much and long, but where there is a great complication of disease about the neck of the bladder. If a patient in this condition be put upon the table, and you commence an uncertain operation upon him, keeping him half an hour or an hour under repeated incisions, and poking with probes, and ineffectual endeavours to pass the elastic gum catheter into the bladder, he begins to vomit: the stomach sympathises with the general suffering: and when he is put to bed he never recovers, he falls into a doze or low delirium, and you have destroyed him by prolonging the excitement or irritation. You have thought by your dexterity to relieve him, but you have failed in your expectation in that—you have erred in judgment, and your patient is lost. In such a case it may be necessary to pass the trocar into the rectum, and from thence into the bladder, and without pain, without irritation, without delay, to relieve him. But these are rare cases, and it is better to cut in the perineum, because you not only relieve him, but lay the foundation for a perfect cure. Still, however, much will depend on his condition.

I remember when it was a regular question, (I need not say where,) how long are you to wait before puncturing the bladder? You perceive the degree of distention is no criterion; because, after the bladder is distended to a certain degree, the urine drips away continually; and therefore a man may have a distended bladder to-day, and may not be worse to-morrow, in consequence of the bladder permitting the surcharge to drip away. I need not remind you that an ill-educated surgeon is apt to be mistaken here just as the patient is. A patient calls you to his aid for *incontinence* of urine, but, upon examining the case, you soon find that he labours under retention; that, notwithstanding the water is dripping from him constantly, some pounds of urine are accumulating in the bladder, a source of painful inflammation. My object in stating this, is to show you that it is the degree of suffering, which, after all, must determine us. A bladder which, in consequence of stricture, has

become so permanently contracted that it has not for many months contained more than two ounces of urine, must give excessive distress, and cause inflammation if distended; when a natural bladder will suffer greater distention without so immediately producing inflammation.

The degree of suffering, the roundness, firmness of the distended bladder, and tenderness of the abdomen, are our best indications. I would say, that when once you feel the bladder above the pubes, like a round ball under your hand, as tense as it is described in this case—the pulse excited, and the man's mind excited, in an extraordinary degree—you must adopt the same rule as in hernia: *not to leave the house till he be relieved.*

5. Now comes a question of extreme delicacy, as it is to be expressed before you, and touching an operation of extreme delicacy; I mean forcing the stricture with a catheter. I acknowledge that I have a narrow-pointed catheter; not sharp, but small, round, and smooth; with which I have sometimes saved the necessity of a more formidable operation, by passing it through the stricture. But it is to be done with fear and trembling; because, although you may succeed in putting the man (as this patient said) “in heaven,”—and I have heard the expression before—yet, on the other hand, you may rupture the urethra. In performing the operation, you must place the patient fairly before you, take care that the instrument is exactly in the centre, introduce it down to the stricture, put your finger in the perineum, and try to get the point of the instrument into the stricture. If you can feel it in the stricture, and, on attempting to withdraw it, find that it is held, you may be certain that it has not passed in a false direction; and then by slowly going on, and gently driving the instrument forward through the stricture, at the same time drawing the integuments of the perineum forward, and then introducing the finger in ano, and so carefully watching the progress of the point until it gets into the enlarged part of the urethra, you may thus save the patient. But I need not remind you of the danger of the operation; the case I have read sufficiently shows it.

6. With regard to puncturing the bladder, it may be done above the pubes, by the rectum, or by the perineum. But I have already stated that it is only in extreme cases, when there is much disease, and the person is just, as it were, upon the brink of running into a state of inflammation and fever, and delirium, that you can think of puncturing the bladder: the more legitimate operation is that which you have seen performed, or heard described.

When we speak of an operation in the perineum, the first thing to be thought of is cutting the stricture. This is an operation of difficulty: see how it is done. The patient is placed on the table, as for lithotomy; the incision is made in the perineum, and a grooved staff is passed down to the stricture, and the point cut upon, by which you get it into the urethra anterior to the stricture. You then pass a fine probe from the anterior part of the stricture,

through the stricture; and if you succeed in this, the operation is easy, for then you have just to feel the probe with the knife, and cut along it. When a patient has suffered what I have described, that part of the canal behind the stricture is enormously enlarged, and we have no difficulty there; the difficulty is in striking the stricture, and if you cannot get a probe through it, you must divide the callous part without a director, the object being to get into the enlarged part of the canal; you then pass a catheter through the penis, across the stricture, into the posterior part of the canal, and from thence into the bladder. The wound is then to be healed over the catheter. This is a pretty operation, when adroitly performed. But I say again (and I think many here have seen the operation attempted both in my hands and those of others,) that it may be a tedious and uncertain operation, and is therefore not to be inconsiderately undertaken: you must be certain that the patient can bear the continued fingering, teasing, and cutting.

I have then to direct you to what you have just seen: the operation of cutting into the urethra posterior to the stricture. I have performed it (and I believe other surgeons have done the same) in a different way to what you have now seen—viz. by a cut of the scalpel upon the face of the perineum. Why have we changed the mode? I will tell you why, and it is important that you should know it. If you have a small gland to cut out about the breast or axilla, you feel it very distinctly through the skin before you begin; but when you have made your cut upon it, and when you have got your fingers among the fatty membrane, you cannot find it—it seems to have disappeared, and you dissect at random. It is very important to remember, that you can distinguish such a body outwardly, before the incision is made, much more easily than when you have cut through the skin and are closer to it. So it is in respect to the parts in the perineum: it is possible, by introducing the finger into the anus, to distinguish the prostate, its two lateral lobes, its centre, where the membranous part of the urethra enters it; and this in a manner much more distinctly than when a cut is made through the integuments, and the finger is in the wound of the perineum. Recollecting the difficulty of hitting the urethra after a deep incision, or of feeling the prostate among dissected parts, I thought it would be better if I put my finger in the rectum, to see that I was exactly in the centre, where the urethra traverses the prostate; and I then passed the sharp-pointed bistoury, directed by the finger (although the walls of the rectum were between the instrument and the finger). Besides, you have here, in this mode of operating, a great advantage in the steadiness of the patient. When you pass a narrow bistoury through the skin, it is not more painful to him than the puncture of a needle; and when it is introduced, you can direct the point of it with great nicety. And now observe, when you think the point of the instrument has struck the membranous part of the urethra, depress the hand, and bring out

the point : by this the bulb of the urethra is cut, as it is very properly stated in the case.

You will please to observe, that the incision of the bulb being in the very central line, we do not touch the larger branch of the artery, as we do in cutting for the stone. Were it at all an object, I could introduce the point of the knife and carry it round the prominence of the bulb ; but I do not think there is sufficient reason for this, seeing that it is my principal object to have a free wound ; that is, penetrating to the urethra, but large outwardly.

It has been stated that the patient ought, in this circumstance, to lose blood ; and he cannot lose from any part with greater advantage than from the bulb. This mode of operating relieves, whilst it is laying the foundation for a permanent cure.

I shall conclude by giving some advice to the house-surgeon. How is he to perfect the cure in this case ? He is to begin to work upon the stricture ; and let me remind him, that, if possible, he is not to destroy the natural membrane of the urethra. If you remove a stricture by caustic, or cutting, or by destroying the natural membrane, and substituting another, the latter never answers the purpose perfectly, or at least permanently. The natural membrane of the urethra is elastic in the finest degree, yields to the push of the urine ; but if you have formed a membrane out of the cellular texture by condensation and inflammation, it has always a disposition to contract, and you have got a patient for life—that is to say, the man must always come back to have his stricture dilated. It is cruel to the patient, and putting yourself in a questionable position with regard to the honour of the profession to act thus, and therefore avoid it. I repeat then, that the house-surgeon must, by gentle means, try to *dilate* the stricture—try to cause absorption of the coagulable lymph outside the membrane ; and when he can pass a considerable instrument into the bladder, he will withdraw the tube from the wound, introduce a catheter along the penis, past the incision, and into the bladder, and so heal the external wound over it.

But again, if he feels unusual difficulty in the introduction of his bougie into the stricture, he will have to reverse the introduction of it, and passing it from below, prosecute his cure in that direction. I should regret the perforating the stricture ; but if it must be done, it will be performed with comparative ease, when an open tube is pushed up to the stricture from below, whilst the perforator is introduced from above. I believe you are pretty well convinced, from what is passing around you, that the complaint of stricture is common enough to deserve all your attention.

Extra-uterine Fœtation, causing Stricture of the Rectum.

27th July, 1826.—Mrs. W. This lady, on her death-bed, ordered that her body should be opened, and the account of appearance transmitted to Sir Charles Bell.

In September last she came to town, having a letter from her medical attendant, descriptive of her complaints. They were the symptoms of stricture in the rectum. She attributed their commencement to a bruise on the side, from having been overturned in an open carriage.

No stricture could be felt with the ball-probe. The probang was used, and it was obstructed in the higher part of the rectum, opposite to the promontory of the sacrum; and, on the whole, Sir Charles Bell gave it as his opinion, that the distress, distention, and apparent torpor and irregularity of the bowel, was owing to a fold of the sigmoid flexure of the colon checking the easy descent of the fæces. Laxatives, clysters, and friction of the belly, gave her relief.

Some few weeks ago, a consultation was transmitted to London for Sir Charles Bell and Dr. Merriman's consideration, on account of an interruption to the menses, attended with great pain in the loins.

When her complaints increased, and she was forced to take to bed, she said to her friends, "When I last consulted Sir Charles Bell, he said, I must find some other disease to die of, for my complaint was not of a nature to take my life. I have then got that disease, for now I am to die."

Her pains increased; she became sick, and ghastly pale; her strength rapidly declined; and she died.

On examining the body, the abdomen was found full of coagulum of blood, and that blood had come from the ovum of an extra-uterine fœtus, which had burst the membranes.

A preparation, now in the College of Surgeons, Edinburgh, exhibits the rectum, with a slight stricture at the last turn of the colon, as it terminates in the rectum.

This case, even in all its minute circumstances, is not solitary. In my collection there is a preparation exactly similar—an *extra-uterine fœtus* pressing upon the rectum, and producing obstruction. May it have happened thus? The original mischief was from the fall and the bruise of the side. The *Fallopian tube* being engaged by adhesion to the rectum, in consequence of the bruise and inflammation,—when conception took place, the action of the Fallopian tube to deliver the ovum into the cavity of the uterus was interrupted; consequently, the ovum remained in its original seat, and hence the catastrophe.

The parts, as I have said, were transmitted to me. The ovum was burst. The uterus exhibited the decidua formed in the inside of that body. The uterus was enlarged, and the os tincæ changed in form. Thus, we see that the pregnancy produces a simultaneous excitement and change in the uterus; and that this change, and the production of the *decidua*, are independent of the *presence* of the fœtus within the uterus. The mass adhered to the rectum just at the brim of the pelvis.

CRUSHING THE STONE IN THE BLADDER.

I propose to-day giving you a clinical lecture on crushing the stone in the bladder. We are bound to address you on this subject by every motive that can actuate the humane mind. There is no torture which a man suffers greater than that from stone in the bladder; and there is no duty which you will have in after-life to perform so oppressive, as that of the operation of lithotomy; for although in favourable circumstances it is safely done, yet, while any obscurity hangs over the condition of the patient, as to his constitutional peculiarities, or as to the size of the stone, or the state of the bladder, it is not without danger. But independently of these reasons, I say we are bound to draw your attention especially to this subject, since the very house over our heads has been built at the expense of those who have taken our promise to attend to the methods of removing the stone without cutting.

First, then, how stands the opinion regarding the operation of lithotomy? You may have heard patients declare that they would rather suffer the operation for the stone twice over, than bear the torture from its presence for one night. You may have heard them say that the operation of sounding for the stone is more painful than the operation of cutting.

The incisions for lithotomy, performed by a man properly educated as an anatomist and surgeon, are simply and quickly made; but in regard to the extraction of the stone from the bladder, it should be done *very* slowly, and consequently the rapidity with which an operation is performed is not the mode of judging of the merits of the operator. There is not an authority in our profession who has not declared against judging of an operation by the time. The taking out of a stop-watch is an indication of improper education. In a late operation performed in our theatre by our assistant, I have understood that the watch was looked to. That indicates both bad teaching and bad example, and would almost incline one to believe, that these individuals had come to see the operation ill performed, instead of witnessing it carefully and well performed, in the mode they ought to imitate.

Still, gentlemen, these deep incisions made on one's-self, who can contemplate without shrinking? and therefore it is of incalculable benefit to have an operation in which these incisions are not necessary. The advantage is this,—that when a man entertains a suspicion of stone in the bladder, he comes at once to his surgeon; whereas, heretofore, he would not allow himself to believe that he was so unfortunate. He lets time pass; he is unwilling even to be sounded, lest his worst suspicions should be confirmed: time passes, the stone gets to be of a large size, and then, indeed, there is danger from the operation of lithotomy. You have no notion how men shrink from the certainty that they have the stone, and linger on suffering from irritation until it is unbearable; and then, when

the stone has acquired a great size, they are forced to submit, in unfavourable circumstances. Therefore, I say it is of incalculable benefit to society, and to us especially, that there is an operation, simple and safe comparatively, which is offered to the contemplation of these sufferers, and which brings them earlier under cure. Let us then give our whole attention to this subject.

An unfortunate idea prevails, got up upon this occasion, I know not on what authority, that we have been all along under a misconception, and that the urinary bladder can bear a great deal more injury than we have imagined.

On this head I beg your particular attention. I have at various times pressed upon you the difference of sensibility in internal and external parts. I have shown you that internal parts—the viscera—have their peculiar sensibility, and that it is totally different from that of the surfaces. But there is more than this: suppose that you are examining a patient with diseased liver, or under the suspicion that he has diseased liver. You lay him down, relax the abdomen, and press along the margin of the ribs, and feel the hardened edge of the liver. You ask him if he has no pain on this pressure; he says, “No.” Or if, not feeling the liver, you press down the cartilages of the ribs, to ascertain if there be morbid sensibility, indicative of inflammation, still he says that he suffers no pain. But by-and-by, when he sits down, and proceeds with the narrative of the disease, he becomes pale, speaks with difficulty, and tells you that he is now in great pain. There is a peculiarity in the sensibility of the liver different from that of the external parts; but it rises slowly after pressure. In the same way, to bring us nearer to the subject, if you are examining *per anum* the state of the prostate gland with the finger, and press all around to find if there be sensibility, or any mark of disease there, and you ask the patient—“Have you pain here—have you pain there?” he says “No.” But when you have withdrawn the finger, and after the examination has been finished for some time, the patient begins to complain of the dull sensation which arises, and becomes at last very painful. So again, with regard to the bladder, but more especially its neck; there is a certain pain, no doubt, felt by the patient during the introduction of the instruments; but all the effect of the interference with the internal part is not shown during your operation, but after it; so that if you are not careful, light of hand, and delicate with the patient, you are called back in the afternoon of the day, and there you find him in a paroxysm of suffering, cold and shivering, the bed shaking under him, and he is in a state most alarming to himself and his friends. Hours have passed, but the paroxysm is the indication of the injury you have in the morning committed upon the neck of the man’s bladder. Do not, therefore, be deceived by this sort of new aphorism got up, that you may do a great deal more injury to the bladder without inconvenience, than has been hitherto supposed; it is an entire mistake.

For the history of the operation of crushing the stone, you must

go elsewhere. It is a long history, which I cannot undertake to follow up so as to appropriate the merit of the discovery to the right individuals. But when the operation was first performed in this country, they brought me an instrument similar to that which I now show you, but larger and stronger, and of which this might almost be said to be the model, for this is intended for a child. The instrument you perceive is straight; and here is another grand discovery, that you can pass a straight instrument into the urethra. This you certainly can do, but I fancy that, as anatomists, nobody will convince you but that there is a curve in the urethra, and although you can pass a straight instrument, you do certain violence to the curved urethra, more especially to the neck of the bladder. When I saw this instrument first, I said, "It appears to me a most dangerous instrument; you see that it is a tube from which certain blades possessed of elasticity can be thrust out, and which, by their expansion, are prepared to seize the stone. I remarked, "Suppose you get hold of the stone, and cannot break it, how can you withdraw the instrument?" The answer was very ingenious: "There is a wire to pass through this tube, which projects against the stone, and displaces it from the grasp of the forceps." That is good, it is ingenious; but suppose that we have got hold of the stone, and that by attempting to crush the stone, instead of effecting our object, the ends of the blades of the instrument bend, and are permanently expanded, what is then to be done? There was no answer to that question, except that it was not likely to happen. But it did happen:—it has happened, not once, but several times. How often it has happened, and how often patients have died under this operation, and from what immediate causes, I am unable to state; and yet these misfortunes should be recorded. Several, I know, have died; but I shall speak of one case, of which I was a witness.

A much-respected gentleman had a stone in his bladder: he was unwilling, as most patients are, to suffer the operation of lithotomy, and called to his assistance the Parisian operator. He proceeded to his operation; he seized the stone, but in pressing down the instrument, the blades did not break off—that would have been of less consequence—but they became permanently expanded, and in this state the instrument was withdrawn through the prostate. (Think of the effects of withdrawing such an instrument through the prostate!) It was brought into the membranous part of the urethra, but farther it could not be withdrawn! What was to be done? There was a call for a pair of blacksmith's forceps—strong pincers; then the patient was placed as for lithotomy, the perineum was cut into, the bulb of the urethra opened, and the forceps applied to the blades to squeeze them together, in order that the instrument might be withdrawn along the urethra. Dr. Hume and Sir B. C. Brodie being in attendance upon the operation, said, "Here is the incision as for lithotomy, why not proceed, and finish the operation?" They knew well, and you ought to know, and remember it, that an ineffectual operation for lithotomy, the stone remaining in the bladder,

is generally fatal, because, in addition to the violence of the operation, there is permanent irritation from the presence of the stone. They determined that the stone should not remain in the patient's bladder; and so Sir B. C. Brodie, with characteristic decision and ability, immediately sent for his instruments, and performed the operation for lithotomy. It was after this period of the case that I was called in, and I saw that gentleman suffering gradual decay, in consequence of the severity of the operation—first, from the introduction of the instrument; secondly, from the operation of seizing, and the attempts to crush the stone; thirdly, from the violent withdrawal of the dilated instrument through the prostate; fourthly, from the incision into the bulb of the urethra and the formidable hemorrhage; and fifthly, from the performance of the common operation of lithotomy. Can you wonder, then, that after lingering some weeks, the patient finally died?

So far, then, I maintain I was right in my conjecture regarding this instrument. It is a most villanous and dangerous instrument; and if you have been tempted to buy it, keep it till you grow rich, and give it to your butler to draw corks from a bottle.

With regard to the patient in the hospital, you see an old blind man suffering severely from the stone. On sounding the man, and dodging the instrument over the stone, I calculated that there was a stone about the size of a chestnut; and remarked that, if we are ever to perform this operation of bruising the stone, here is the instance; and I was prompted to think that I could do it (pardon me for saying so) with as light a hand, and with as much regard to the patient's feelings, as I had seen the operation performed; I performed the operation at three different times, and he is now discharged well.

The operation is this:—In the first place the bladder must be injected, for this reason, that the stone is apt to lurk between the fleshy columns of the bladder. When the bladder is irritated by the presence of a calculus, fleshy columns arise, formed out of the fibres of the detrusor urinæ; by dilating the bladder you separate these, as it were, and force the stone out of the recesses between the columns; and then again, in catching the stone, you are in no danger of including the folds of the bladder when it is distended. That is the reason of filling the bladder with tepid water. In the next place, you lay the patient so that the stone falls a little to one side.

I have said, in speaking of lithotomy, that the surgeon who sounds dexterously will perform the operation well, because, by sounding well he calculates the depth of the bladder, and the actual position of the stone, and he can get the stone to that recess where he is sure to strike it. If he acquire a proper notion of the position and size of the stone, the operation of lithotomy is comparatively simple. So also he that can discover the stone with little pain to the patient, is likely to succeed in this operation (not forcing in the instrument, and striking with violence against the stone, but rather, by turning

the patient, bringing the stone by gravitation into contact with the instrument). I say that the surgeon ascertaining thus the actual position of the stone, will perform the operation of catching it and crushing it easily.

As to the instrument which you are to introduce to crush the stone, this which I now present to you is it. You see at once that it is a totally different instrument from that which I before showed you. There is an advantage in the curved form; it may be very easily introduced into the neck of the bladder without inflicting pain. But the greatest advantage of this instrument is its strength. This instrument is the invention or the improvement of a person who certainly will not hide his candle under a bushel; and he is quite prepared to stand his ground with any inventor in Paris or elsewhere. Notwithstanding there is a sort of conceit about him, yet I value the instrument on account of its form and strength; for I repeat, I care not so much about breaking the instrument, as the fragment can be withdrawn with the stone by lithotomy; but bending the instrument is the most formidable thing, inasmuch as we can neither let it remain nor withdraw it without a rude and painful operation. Indeed, all these instruments should be proved like a piece of ordnance before they are used. Now, observe how it is to be used. If, for example, the stone be of the size of a walnut, we must then prepare that the blades shall separate to that extent. Having introduced the instrument into the bladder, and turned it to the side on which the patient lies, and felt the stone, you slowly open the blades by withdrawing the upper one thus; and perhaps you feel the patient flinch a little. You saw that as soon as I had chucked upon the stone, it was immediately seized. There is not the slightest difficulty in this part of the operation, neither is there pain if you do not open the instrument suddenly, and to a great extent. Take time, do it delicately and nicely, and there is neither difficulty to you nor pain to your patient. During the operation, I was desirous to know what pain was inflicted by the operation. I requested the patient to tell me whether he was suffering pain. "Oh," said he, "I cannot expect to get rid of a stone in the bladder without pain." "Nay; but tell me," I replied, "how do you feel—are you suffering much pain?" "Oh, you know there must be pain." But he never winced,—never moved a muscle, never interrupted his chat,—and therefore I must presume that the man was not suffering; for, if he endured pain, he must have had extraordinary fortitude neither to wince, nor cry, nor even to change his voice, but readily to converse with me during the operation.

When the stone is seized, you can move the instrument to any part of the bladder you choose. You cannot, by pushing down the button attached to the sliding blade with your finger, crush the stone; but there is a screw, having great mechanical power, and you must use it, not by turning it uniformly, but by bringing it back again, and so working it as to grind the stone gradually, and by distinct blows. By this means you break the stone down as if

it were bruised with a hammer; and it is not so apt to break and fly by each successive impulse as by screwing down the sliding blade at once by the mechanical power of the screw. The stone being thus crushed, and a great portion of the fragments being brought out in the grasp of the instrument, it is so far satisfactory. It will sometimes happen that the stone will remain, choking up the instrument, and you can with difficulty get the blades together. The meaning of this slit, which is otherwise to be regretted, as weakening the instrument, is to let the *debris* be forced through. You calculate, from the position of the sliding ring along this scale, how far the blades remain apart; and they must be brought nearer, almost together, before you attempt to withdraw the instrument. There is a part of the operation here which I like, as being ingenious; a vice having attached to it a heavy mass of metal, is screwed upon the shaft, which belongs to the further and fixed blade, and then the other shaft is struck down with smart blows of the steel hammer, until the upper blade is so far pressed upon the lower that the instrument can be withdrawn. What is the meaning of this appended mass of metal? There is a *vis inertiae* in it; and accordingly, in striking the instrument, instead of endangering the bladder, the impulse is resisted by the appended mass, and you can therefore give a smart blow without any shock.

Is it not an admirable thing to bruise a stone into these fragments, [handing round a bottle containing them]—and does it not appear to you a very simple thing?

But you have not yet considered the source of pain and danger. The operation, I say, is not a painful one, but the consequences are sometimes very formidable. In the first place, there is a great uncertainty of getting the stone altogether away; there is a possibility of some fragment remaining, and if it should, there is great pain, and another stone will form upon it as a nucleus. I was consulted by a gentleman not far removed from our hospital, on whom this operation was performed. He seemed in just such a condition as the patient whom you have seen, and the operation was perhaps as easily done. There had been two or three successive operations; and the patient said, "I think I will do handsomely—I will give the operator 100 guineas." "No," said the operator; "my fee is 400 guineas!" He gave his 400 guineas; and when I sounded him some considerable time afterwards, I found there was still a stone in the bladder, and that the pain had returned, and with it the glairy deposit in the urine. I felt that it would then have been easy to crush the stone.

It is then true, that with the most experienced performers a portion of the stone, like a shell, is apt to remain, and to form the nucleus of another stone. I do not consider this as a great objection to the operation, but it points out to you the necessity of not being too sanguine that you have removed every part; and it shews the necessity of again and again examining the bladder, and washing it out carefully.

There is not merely danger of a portion remaining in the bladder, but worse than this—a fragment, such as you have in that bottle, may stick in the orifice of the bladder, or in the lacunæ of the prostate, and then the suffering of the patient is beyond expression. The contraction of the neck of the bladder upon the sharp stone, the inability to discharge the urine, the spasm that takes place in the bladder, and the inflammatory condition of the prostate, are all very serious consequences, and attended with great suffering.

You can the better comprehend all this because you have seen it in my patient. You saw that after the second operation he suffered excessively, from a sort of paroxysm, which implied no more than might have taken place if a very rude hand had forced a large bougie through the prostate. But afterwards he suffered in a different way—viz. from a portion of the stone lodging in the neck of the bladder, so that he had frequent calls to make urine, and purulent and mucous discharge from the neck of the bladder.

In a private patient whom I attended during the progress of the operation, it was necessary to introduce the catheter and inject tepid water, so as to push and wash back the fragment into the bladder, to give temporary relief.

It was on account of this patient's suffering that I got a double catheter made for injecting the bladder. I did not know that this very excellent instrument [presenting it] had been provided and was in the case. I commend this to you for your adoption: it combines the means of holding a portion of the stone, with the uses of a catheter. You can introduce this and inject the bladder, and then allow the bladder to empty itself through this tube; trusting, that if there be a portion of stone remaining, it will come, by the force of the stream, into the groove, and then you can take hold of it and withdraw it. It is a most ingenious and excellent addition to the other instruments.

At one time our patient had frequent calls to make water, and discharged great quantities of glairy mucus. Those were the symptoms of the portions sticking near the orifice of the bladder. This mucus you saw tough, hanging from the pot; and in some cases it is discharged bolt out in a mass, so as to give the patient the sensation of a large body being discharged.

Such is the result of a broken portion of the stone (which is often like the broken shell of an almond), sticking and clinging to the prostate, or entering into the dilated part of the urethra which is within the prostate, obstructing the urine mechanically, and at the same time causing painful spasm.

One operation of crushing will not be sufficient; nor two, nor three; it must be repeated again and again, and it is only a small stone which you ought to attempt to crush: you will be baffled by a large stone, and you must acknowledge that when there is a large one it is a case in which it will be necessary to perform lithotomy. When there is a small stone, this operation is safely performed, and with the best success; but, as I said, not by one operation, but by

several. The suffering, I repeat, is not during the operation, but afterwards; nor must it be concealed that many have died in consequence of this operation. If I have a feeling against the operators, it is from finding that there have been deaths undivulged, and not fairly put in balance when the operation has been contrasted with lithotomy.

I believe I have fairly stated to you all that has come to my knowledge—that which I have seen with my eyes and felt with my hands; keeping out of sight all that has been said in controversy: in fact, I know very little about the controversies which have been entertained on this subject.

In conclusion, then, consider the operation as belonging to your profession, and as a thing you can do with propriety and efficiency, if you know the form and position of the bladder—if you calculate the gravitation and lodgment of the stone, and if you can sound well and safely. All that I have to recommend to you is, that, having crushed the stone, you should see that the fragments are removed, and take care to wash the neck of the bladder during the paroxysm. I believe there is an instrument to slit and open the passage, and allow the stone to escape: it is highly improper to use such an instrument, and the invention of it is only declaring demonstratively the severity of the suffering from the sticking of the fragments in the passage. On the whole, this is a very important operation—a real accession to our means of giving relief: it brings patients to your hands, when you can do them essential service: it prevents them lingering and hanging off till the stone is too large for the operation of crushing, or even of lithotomy.

I look upon the ingenious inventions exhibited in these instruments [there were many on the table], as promising us means of breaking the stone in the operation of lithotomy. If the operation of lithotomy is to be limited to the cases where the stone is large, then will the character of the operation quickly decline: for there is no accident in lithotomy which, by care and dexterity, may not be obviated, but those which attend the extraction of a large stone, and hardly any contrivance or exercise of ingenuity will mitigate the evil. To do the operation without violence or tearing, is to make it certainly successful; and for this purpose the stone, if large, must be divided, not brought through entire. It is not an operation for display, but to ensure you a better reward than the approbation of a whole theatre of gentlemen, with watches in their hands.

Lithotrity—Vindication of my Clinical Remarks.

SIR,—You did me the honour of giving a report of my Clinical Lecture on “Crushing the Stone in the Bladder.”¹ The observations of Sir Benjamin Brodie, Baron Heurteloup, M. Civiale, and our late

¹ See Medical Gazette, vol. xvii. p. 997.

president of the College of Surgeons, appear to call for some remarks, or, if you choose, apology, for that lecture.

There is a wide difference between the dissertation of a man who is the advocate of a particular measure connected with his own character and success, and the lecture of one sitting before pupils, anticipating their difficulties, and earnestly pointing out to them the occurrences which may befall them, to their extreme mortification, and the injury of their prospects during their first years of practice. I take a more confined view of a clinical lecture than some of my eminent friends, and find it impossible to make it so excursive and so pleasant. An operation is performed: it is our duty to take the occasion, whilst the pupil is animated with interest on account of the scene, to see that it makes a due impression; and especially to prevent him supposing that that is easily done, the successful practice of which has resulted from the combined endeavours of many members of the profession, and after many disappointments and much ill success.

I can very well conceive Mr. Alexander speaking of the operation of extraction of the cataract as a thing very simple and sure of success. Operating many times in a day, and for a succession of years, it is at least very natural that he should represent it as the best, most successful, and easiest to be done,—being so, indeed, in his hands. But would that be the language becoming in a teacher addressing himself to pupils? Would not the sure consequence be, ill-performed operations, disappointment, and loss of character? Is it not the duty, then, of one who even pretends to have an interest in his pupils, to tell them what has befallen others—to set before them all the difficulties of the operation, and to contrast the different methods of operating?

There is a mode of judging of what others are doing, which I think a very fair one. If I go into a cutler's shop, and ask to see the different instruments for lithotomy, and I find this man's gorget, and another man's bistoury—some blunt, some sharp, some cutting on one part of the edge, and some on another; and more especially if I see a series of instruments that have undergone successive improvements by the same individual; am I not authorised to interpret this language—am I not entitled to say that the surgeon has felt his way, encountered difficulties, and is here trying to obviate them in future? If a man, for example, should cut for the stone thirty times with success, by the lateral operation, and yet perform the succeeding operation by cutting above the pubes, he is the most severe commentator on himself; for were another person to deny the truth of his assertion as to his previous success, or to object to his mode of operating, it would fall short of the severity of criticism that he has inflicted upon himself. It is in this way that I have criticised the operators in "lithotrity." Already we may find, not only in the instrument makers' shops, but in the pawnbrokers', an endless variety of instruments for "lithotrity." I see a continual effort, by the multiplication of instruments, to avoid something that

has happened. I inquire, and I do find that most formidable accidents have occurred, which it was the duty of some one to promulgate, and which it is the especial duty of an hospital surgeon to notice, and to adduce as warnings to his pupils.

If we look back to the history of our profession, what a lesson it affords us? Medicines are recommended to the public, and multitudes of successful cases that have been treated by them are brought forward, but in which the physicians have deceived themselves; the substances to which they have attributed so much virtue being now known to be inert. It is human nature to practise the delusion on itself; and so instruments are vaunted until their ingenious inventors bring something else forward, stronger, better, and safer; and then only are the defects of the former acknowledged.

Sir, I have been the advocate of crushing the stone in the bladder. I have shown the difficulties and dangers of lithotomy, and I have contrasted them with the difficulties and dangers of "lithotritry." Looking upon the subject unbiassed, and as embracing questions paramount to all private considerations, what I have said has been believed.

I have been twitted with referring to an unfortunate accident in the operation of crushing the stone, as if I had with no friendly intention brought forward a mishap that occurred long ago, and ought altogether to have been forgotten. This is my answer; on the day, and I verily believe the very hour, in which I was delivering my lecture, a similar accident occurred. The instrument being introduced into the bladder, and a stone caught, it was found impossible to crush it, and as impossible to withdraw the instrument; it was necessary to make a cut in the perineum, and to pick out the stone from the embrace of the instrument. Is it not just that such things should be known; that the most successful operator, operating with the last improvement of his instruments, meets with these disasters?

Perhaps in clinical discourse, as well as in writing essays, we may wander from the practical question; but when the suffering patient is actually before us, and we are asked an opinion, he must be a bad, as well as a stupid man, who does not concentrate all his energies to the point at issue. I am called in to this patient, in whom the accident last referred to occurred, for the third time, the external wound being closed. I sound him, and find a rough soft stone lying at the neck of the bladder. I have the indescribable advantage of the sound-headed, ingenious, and conscientious surgeon, Mr. Copeland, being in consultation. We take all the circumstances into consideration; they are various and distressing: the patient has suffered this operation of "lithotritry;" it has been thought to have been successful, and the operator dismissed. We have, after this, sounded, and found a stone: the operation has been attempted again: the instrument has got entangled; it has been necessary to cut into the perineum; a small round mulberry calculus has been extracted; after all this, the symptoms have returned—pain in the glans penis, frequent calls to pass urine, disturbed nights,

thick tough mucus deposited in the urine; he is again sounded, and an irregular soft mass of stone is discovered in the bladder. The patient is fatigued and dissatisfied with these ineffectual operations; he would now prefer lithotomy. We think it our duty to dismiss all these untoward circumstances from our minds, to bring home the case, and to say, suppose we ourselves had this calculus, we should desire to have it crushed: we recommend the patient to submit again, and to have the Baron Heurteloup once more called in. May he never have a more severe critic than he has found in me!

As to the main question of the propriety of the operation, when a fit case presented in the hospital, I performed the operation publicly. When I found the proper case under the hands of Baron Heurteloup, I conscientiously recommended him to persevere: in another case, I put my patient in the hands of Mr. Costello, and it is my duty to say that the patient perfectly recovered. What is the meaning, then, of this outcry, as if I were illiberally condemning the operation? What I have said may well have given offence,—that misfortunes have been improperly concealed; but in giving them publicity, I have done no more than my duty.

From all the consideration that I have been able to give to this subject, the comparative merits of crushing the stone in the bladder, and of the operation of lithotomy, will never be duly appreciated, until they are both performed in our public hospitals. Then I anticipate that the operation of crushing the stone will be limited to certain conditions, and that lithotomy must be performed in others; that the history of that greater operation will continue to be the subject of the highest interest in our art; and this conviction, sir, must be my apology for this long letter. I have the honour to be your very obedient servant,

CHARLES BELL.

THE END.

